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STATE EMPLOYEES' RETIREMENT SYSTEM
100 YEARS OF SERVICE

MAKING A DIFFERENCE - THEN. NOW. TOMORROW.

# 2022

# Annual Comprehensive Financial Report

With Independent Auditors' Report for Fiscal Years Ended December 31, 2022 and 2021

Commonwealth of Pennsylvania
State Employees' Retirement System

A Component Unit of the
Commonwealth of Pennsylvania

DEFINED BENEFIT PLAN
Traditional Pension

DEFINED CONTRIBUTION PLAN
Investment Option

pennsylvania
STATE EMPLOYEES' RETIREMENT SYSTEM
100 YEARS OF SERVICE
MAKING A DIFFERENCE - THEN. NOW. TOMORROW.

# 2022

# Annual Comprehensive Financial Report

With Independent Auditors' Report for Fiscal Years Ended December 31, 2022 and 2021

Commonwealth of Pennsylvania
State Employees' Retirement System

Prepared by the staff of the
Pennsylvania State Employees' Retirement System

**Joseph A. Torta**
Executive Director

**Sara E. McSurdy**
Chief Financial Officer

**State Employees' Retirement System**
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A Component Unit of the
Commonwealth of Pennsylvania

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## GFOA Award Certificate

Government Finance Officers Association

# Certificate of Achievement for Excellence in Financial Reporting

Presented to

**Commonwealth of Pennsylvania**
**State Employees' Retirement System**

For its Annual Comprehensive
Financial Report
For the Fiscal Year Ended

December 31, 2021

Christopher P. Morrill

Executive Director/CEO

Public Pension Coordinating Council

## *Public Pension Standards Award For Funding and Administration 2022*

Presented to

## Pennsylvania State Employees' Retirement System

In recognition of meeting professional standards for
plan funding and administration as
set forth in the Public Pension Standards.

*Presented by the Public Pension Coordinating Council, a confederation of*

National Association of State Retirement Administrators (NASRA)
National Conference on Public Employee Retirement Systems (NCPERS)
National Council on Teacher Retirement (NCTR)

Alan H. Winkle
Program Administrator

June 9, 2023

The Honorable Josh Shapiro, Governor
Commonwealth of Pennsylvania

Mr. David R. Fillman, Chairman, Pennsylvania State Employees' Retirement System

Members, Pennsylvania General Assembly

Members and Participants, Pennsylvania State Employees' Retirement System

Dear Governor Shapiro, Chairman Fillman, Legislators, Members, and Participants:

The Pennsylvania State Employees' Retirement System (SERS) is pleased to present you with the 2022 calendar year Annual Comprehensive Financial Report (ACFR). The purpose of this report is to provide the Governor, legislature, system members, participants, and annuitants, as well as the public with a clear accounting of SERS' operations and financial position. We hope you will find this financial, investment, actuarial, and statistical material produced by SERS management to be both interesting and useful.

SERS remains committed to delivering accurate, meaningful information to policymakers and SERS members, as well as to provide context for our independently audited financial statements. Stakeholders can be assured that their retirement system is administered well, and that staff carefully manages the funds entrusted to the board. Please refer to Management's Discussion and Analysis, beginning on page 4, for an overview of SERS' financial statements, as well as significant events and circumstances that impacted the operations and performance of the fund during the past year.

SERS administers four retirement plans for state employees – three plans require mandatory employee and employer contributions and one plan allows only voluntary employee contributions:

- **Hybrid Plan** – is a combination of two Internal Revenue Code-defined plans – a traditional pension or Internal Revenue Code (IRC) section 401(a) defined benefit plan with an IRC section 401(a) defined contribution investment plan. This plan requires mandatory contributions from both the employee and the employer. There are two classes of service within the Hybrid Plan, class A-5 and class A-6.

- **Defined Contribution Plan** – is an IRC section 401(a) investment plan. This plan requires mandatory contributions from both the employee and the employer.

- **Defined Benefit Plan** – is a traditional pension plan defined by IRC section 401(a). This plan requires mandatory contributions from both the employee and the employer.

- **Deferred Compensation Plan** – is a voluntary supplemental plan defined by IRC section 457(b). This plan allows only voluntary employee contributions. (Note: The Deferred Compensation Plan has its own stand-alone financial statements and is not included in the ACFR).

Most new state employees are automatically enrolled in the Hybrid Plan A-5 class of service, with the right to opt out of that class of service into the Hybrid Plan A-6 class of service or the defined contribution-only plan. The exceptions are hazardous-duty employees and those who contributed to the traditional defined benefit pension plan in the past. In those two cases, the employee is automatically enrolled in the traditional defined benefit pension plan.

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For 2022, KPMG LLP has conducted an independent audit of SERS financial statements, which are prepared in accordance with U.S. generally accepted accounting principles. Because the cost of a control should not exceed the benefits to be derived, the objective is to provide reasonable, rather than absolute, assurance that SERS financial statements are free of any material misstatements and fairly presented. As is our standard practice, independent auditors have full and unrestricted access to you and the board to discuss their findings regarding the adequacy of SERS internal controls and the integrity of SERS financial reporting.

SERS again received an unmodified opinion in 2022.

The Defined Contribution Plan opened for enrollment on January 1, 2019. As of December 31, 2022, there were over 25,300 accounts established and the plan had a net position of approximately $105.8 million. The plan receives participant and employer contributions and the participant can choose to invest their money in several investment options, with most plan participants investing in the default option of a target date fund. A number of important legislative changes made in 2020 helped improve the funding stability of the Defined Contribution Plan. These included establishing the ability for SERS to assess a per-participant charge to all employers to cover the fees, costs, and expenses associated with the plan, as well as allowing for SERS to utilize unvested employer contributions towards paying the administrative costs of the plan. More information regarding the Defined Contribution Plan can be found throughout this report, while the remainder of the financial information in this letter is for the Defined Benefit Plan only.

As of December 31, 2022, the SERS' Defined Benefit Plan had a net position of approximately $33.6 billion after paying out approximately $3.9 billion in retirement benefits to more than 135,000 retirees and beneficiaries; $3.5 billion was paid to people living in Pennsylvania, stimulating local economies.

In 2022, SERS served approximately 239,000 total members from 101 agencies/employers.

In mature pension plans such as SERS, newly retired members entering the pension rolls tend to have higher benefits than those who die and are removed from rolls. SERS' experience reflects that trend. In 2022, approximately 6,100 SERS members retired with an average annual benefit of about $30,900, while approximately 4,800 retirees with an average annual benefit of about $18,400 were removed from the rolls.

SERS' investment activities are focused on accomplishing our central mission – providing benefit payments to members and participants at the lowest cost to the commonwealth and to fund the program through a carefully planned and executed investment program. These investment activities are guided by a formal *Statement of Investment Policy* that was first adopted in 1979 and periodically revised and updated to reflect and incorporate legislative changes governing investments and amendments to policies guiding investments. The governing policy in place for 2022 was adopted December 4, 2019 (*"SERS' Defined Benefit Plan Investment Policy Statement"*), with further amendments enacted throughout 2020, 2021, and 2022.

The past year, 2022, brought an array of economic challenges, including the worst stock market performance since the Great Recession of 2008; high, persistent inflation; chronic supply chain issues; and the war in Ukraine – whose impact rippled through many sectors of the global economy.

Thankfully, such "down" years tend to be few and far between. This is, after all, the 100th anniversary of SERS' establishment, in 1923. There have been many ups and downs over the years. For example, the SERS Fund produced an approximate 25% return in 2003, and experienced more than a 28% loss in 2008's worldwide downturn. But through it all, SERS has remained a strong and viable resource for its members and participants.

Like many public pension funds, SERS' investment returns in 2022 fell short of expectations. During 2022, SERS saw investment losses of approximately 12.2% for our Defined Benefit Plan, which was below the fund's annual assumed rate of return of 7.0% that was in place during the year.

Nevertheless, in 2023, we look to continue to make progress toward our long-term goal of eliminating our unfunded liability, thanks to an investment policy that allows us to adjust for unusual economic circumstances as we saw in 2022, ongoing efforts to implement efficiencies across SERS, and continued payment of the full annual actuarially required funding amount by the General Assembly.

Now that SERS employers are paying the full "uncollared" contribution amount, after several years of underfunding, there continues to be a positive trend toward paying down the unfunded liability. This funding is crucial for the overall long-term health of the pension system.

Based on the Governmental Accounting Standards Board Statement No. 67 accounting valuation as of December 31, 2022, the resulting net pension liability was $21.0 billion. SERS plan fiduciary net position as a percentage of the total pension liability was 61.5%. Based on the actuarial methods used for funding purposes, as of December 31, 2022, the unfunded actuarial accrued liability was $17.5 billion. SERS funded ratio was 68.0%.

Employer contributions in 2022 represented a decrease of $796 million – or 28% – compared to 2021. This decrease was due primarily to the fact that, during 2022, there were no lump sum contributions under Act 2019-105 as had occurred in 2020 and 2021, when both Penn State University (April 2020) and the Pennsylvania State System of Higher Education (April 2021) submitted payments of $1.06 billion and $825 million, respectively, toward their unfunded liability. It should be noted that Act 2019-105 sets a deadline of December 31, 2024 for eligible employers to enter into an agreement with SERS to make a lump sum payment of their unfunded liability.

The FY 2023-24 composite employer contribution rate will increase to 35.32% of payroll. The key factors in the increase include the shortfall in expected 2022 investment return, a reduction in the investment return assumption from 7.0% to 6.875% effective with the December 31, 2022 valuation, and pay increases that were different from earlier assumptions. Employer contributions for FY 2023-24 are estimated to generate approximately $2.2 billion for the fund.

The annual cost of the plan continues to drop as the number of members in the newer classes of service, including the A-3 and A-4 classes and the new A-5, A-6, and defined contribution classes that opened January 1, 2019, increases. These newer classes of service comprise 55% of the active member count as of December 31, 2022.

SERS continues major initiatives to improve services to our stakeholders, as well as improving efficiencies in the delivery of benefits and reducing costs in the administration of the system.

Improving customer service to our members remains a top priority for the plan. We continue to enhance our member materials, striving to make the information they provide more understandable and accessible to a range of employees. We increasingly leverage technology to deliver many of these materials electronically, allowing the plan to reduce administrative costs and employ data-driven results to help guide future communication initiatives. SERS is also working to complete its multi-year benefits processing system upgrade that is expected to further improve how we interact with our members, their account-related transactions, and payment processing.

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to SERS for its Annual Comprehensive Financial Report for the fiscal year ended December 31, 2021. In order to be

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awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized annual comprehensive financial report. This report must satisfy both generally accepted accounting principles and applicable legal requirements. A Certificate of Achievement is valid for a period of one year only. We believe the Annual Comprehensive Financial Report, continues to meet the Certificate of Achievement Program's requirements and we are submitting it to GFOA to determine its eligibility for another certificate.

We are solely responsible for the contents of this report; however, we do wish to acknowledge the significant contributions of many SERS professionals whose work to compile, quality assure, and produce it is essential.

The commitment of the agency's 200+ employees ensures that we maintain effective internal controls to assure that assets are safeguarded, transactions are properly executed, and financial statements conform to U.S. generally accepted accounting principles – all while providing effective, high-quality member services. SERS remains dedicated to providing the highest level of service to commonwealth employers, policymakers, employees, retirees, and the SERS Board. Staff at all levels strive to provide exceptional service to those who have dedicated their careers to the citizens of Pennsylvania and maintain careful stewardship of public dollars.

Respectfully submitted,

Joseph A. Torta
Executive Director

Sara E. McSurdy, CPA
Chief Financial Officer

## SERS Mission, Vision, and Organizational Chart

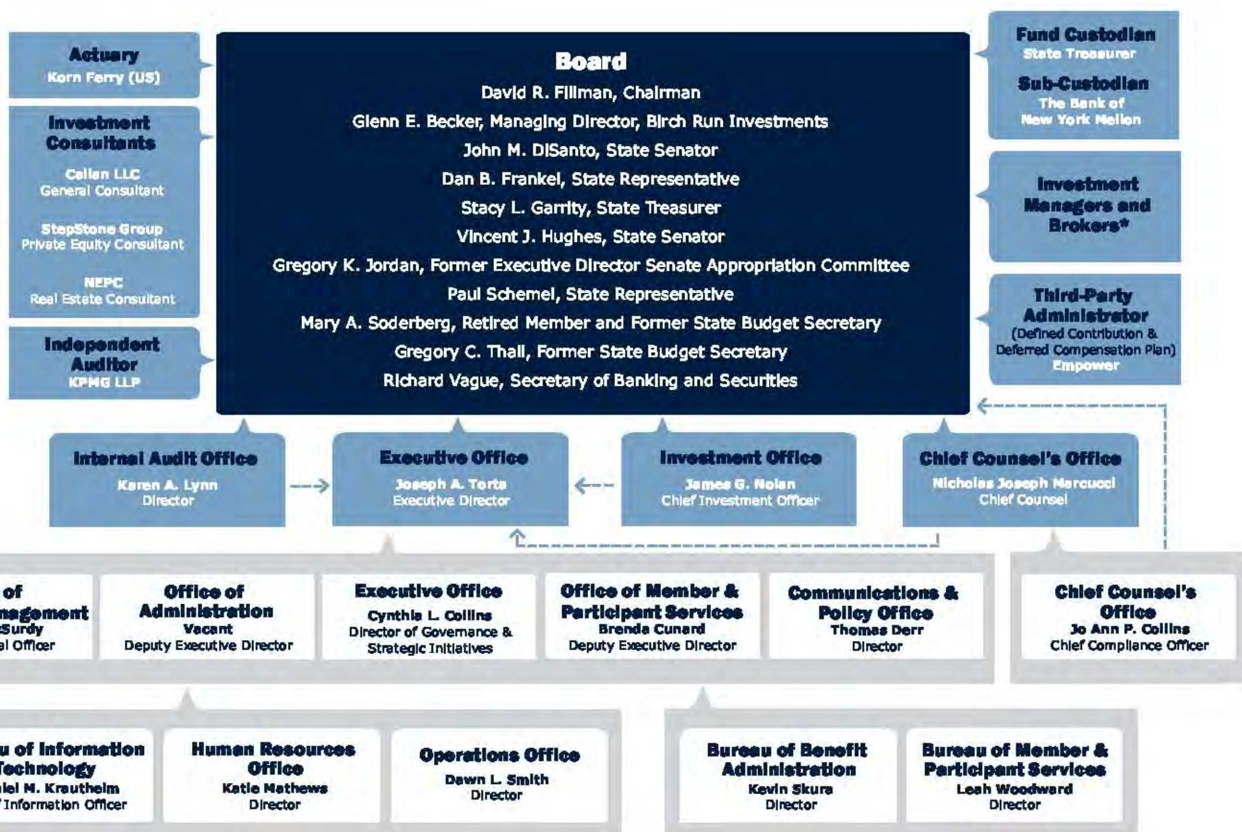
### Mission

The mission of SERS is to prepare our members and participants to achieve financial success and security in retirement.

### Vision

SERS' vision is to become fully funded and the recognized leader among pension organizations providing innovative, best-in-class services and products to our customers and stakeholders.

### Organizational Chart




*Investment managers are listed throughout the Investment Section on pages 50 - 86 and brokers are listed in the Schedule of Trading Broker Commissions on page 61 in the Investment Section of this ACFR.

As of 12/31/22

**SERS Board**
**December 31, 2022**

**Mr. David R. Fillman**
Chairman



**Mr. Glenn E. Becker**
Managing Director, Birch Run Investments



**Honorable John M. DiSanto**
State Senator



**Honorable Dan B. Frankel**
State Representative



**Honorable Stacy Garrity**
State Treasurer



## SERS Board
**December 31, 2022**

**Honorable Vincent J. Hughes**
State Senator



**Mr. Gregory K. Jordan**
Retired Member and Former Executive Director
Senate Appropriation Committee



**Honorable Paul Schemel**
State Representative



**Honorable Mary A. Soderberg**
Retired Member and Former
State Budget Secretary



**Honorable Gregory C. Thall**
Attorney and Former
State Budget Secretary



**Honorable Richard Vague**
Secretary of Banking and Securities



# Financial Section

pennsylvania
STATE EMPLOYEES' RETIREMENT SYSTEM
100 YEARS OF SERVICE
MAKING A DIFFERENCE - THEN. NOW. TOMORROW.

KPMG

KPMG LLP
Suite 1000
30 North Third Street
Harrisburg, PA 17101

**Independent Auditors' Report**

The Members of the Board
Commonwealth of Pennsylvania
State Employees' Retirement System

*Opinion*

We have audited the financial statements of the Commonwealth of Pennsylvania State Employees' Retirement System (SERS), a component unit of the Commonwealth of Pennsylvania, as of and for the years ended December 31, 2022 and 2021, and the related notes to the financial statements, which collectively comprise SERS' basic financial statements for the years then ended as listed in the table of contents.

In our opinion, the accompanying financial statements referred to above present fairly, in all material respects, the fiduciary net position of SERS as of December 31, 2022 and 2021, and the changes in fiduciary net position for the years then ended in accordance with U.S. generally accepted accounting principles.

*Basis for Opinion*

We conducted our audits in accordance with auditing standards generally accepted in the United States of America (GAAS). Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of SERS and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audits. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

*Responsibilities of Management for the Financial Statements*

Management is responsible for the preparation and fair presentation of the financial statements in accordance with U.S. generally accepted accounting principles, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about SERS' ability to continue as a going concern for twelve months beyond the financial statement date, including any currently known information that may raise substantial doubt shortly thereafter.

*Auditors' Responsibilities for the Audit of the Financial Statements*

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in

KPMG

the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

In performing an audit in accordance with GAAS, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of SERS' internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about SERS' ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control related matters that we identified during the audit.

*Required Supplementary Information*

U.S. generally accepted accounting principles require that the management's discussion and analysis on pages 4-13 and the required supplementary information in schedules 1 through 3 on pages 47-48 be presented to supplement the basic financial statements. Such information is the responsibility of management and, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with GAAS, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audits of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

*Supplementary Information*

Our audits were conducted for the purpose of forming an opinion on the financial statements that collectively comprise SERS' basic financial statements. The supplementary information in schedules 4 and 5 on pages 49-50 are presented for purposes of additional analysis and are not a required part of the basic financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. The information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with GAAS. In our opinion, the information is fairly stated, in all material respects, in relation to the basic financial statements as a whole.

*Other Information*

Management is responsible for the other information included in the annual comprehensive financial report. The other information comprises the introductory, investment, actuarial and statistical sections but does not include the basic financial statements and our auditors' report thereon. Our opinion on the basic financial statements does not cover the other information, and we do not express an opinion or any form of assurance thereon.

In connection with our audits of the basic financial statements, our responsibility is to read the other information and consider whether a material inconsistency exists between the other information and the basic financial statements, or the other information otherwise appears to be materially misstated. If, based on the work performed, we conclude that an uncorrected material misstatement of the other information exists, we are required to describe it in our report.

KPMG LLP

Harrisburg, Pennsylvania
May 24, 2023, except for the Other Information section of our report, as to which the date is June 9, 2023.

## Management's Discussion and Analysis

**December 31, 2022 and 2021 (unaudited)**

This section presents Management's Discussion and Analysis of the Pennsylvania State Employees' Retirement System's (SERS) financial statements, as well as the significant events and conditions that affected the operations and performance of SERS during the years ended December 31, 2022, 2021, and 2020.

In addition to historical information, the Management's Discussion and Analysis includes forward-looking statements, which involve currently known facts and certain risks and uncertainties. Actual results and performance may differ materially from those expressed or implied in the forward-looking statements due to a wide range of factors including but not limited to: changes in securities markets, general economic conditions, interest and inflation rates, legislation, and global conflicts.

### Overview of the Financial Statements and Accompanying Information

SERS administers two mandatory-participation retirement plans defined by the Internal Revenue Code: the Defined Benefit Plan, for which assets are held in the State Employee Retirement Fund (Defined Benefit Plan or pension plan); and the Defined Contribution Plan, for which assets are held in a trust with ownership attributed to individual participant investment accounts. The financial statements present the financial position and activities for the Defined Benefit Plan and the Defined Contribution Plan.

(1) **Financial Statements**. SERS presents Statements of Fiduciary Net Position as of December 31, 2022 and 2021 as well as Statements of Changes in Fiduciary Net Position for the years then ended. These statements reflect resources available for the payment of benefits as of year end, and the sources and uses of those funds during the year.

(2) **Notes to Financial Statements**. The notes to financial statements are an integral part of the statements. SERS encourages readers to review them because the additional detail will provide a more complete understanding of the financial statements. Among other items, the notes provide information about SERS' organization; benefits and contributions; determination of investment values; contingencies and commitments; and actuarial liabilities and the associated methods and assumptions used to calculate them.

(3) **Required Supplementary Information**. The Required Supplementary Information (RSI) consists of:

- This Management's Discussion and Analysis (MD&A)
- A schedule of changes in net pension liability and related ratios
- A schedule of employer contributions
- A schedule of investment returns

(4) **Other Supplementary Information Schedules**. Other schedules provide details of SERS administrative, investment, and consultant expenses. Supplementary information is considered useful in understanding and evaluating the financial activities of SERS.

### Financial Highlights

- In 2022, inflation continued to increase, high prices across most industry sectors persisted, and the financial market volatility that started during COVID-19 continued. Due to these financial market challenges in 2022, SERS experienced negative investment returns. SERS experienced a time-weighted rate of return on investments of -12.2% for the year ended December 31, 2022, and 17.2% for the year ended December 31, 2021.

- In July 2021, the SERS Board deliberated and decided to maintain the 7.0% Defined Benefit Plan investment return assumption for the December 31, 2021, valuation. In June 2022, the board approved a reduction in the investment return assumption from 7.0% to 6.875%, which was effective with the December 31, 2022, valuation.

- In April 2021, the State System of Higher Education (PASSHE) paid a one-time lump sum contribution of $825 million toward its Defined Benefit Plan unfunded liability. Penn State University made a similar payment in April 2020, in the amount of $1.06 billion. In return for their lump sum contributions, these employers will receive an annual credit against their contributions over 30 years, following a schedule set forth in their respective agreements.

- The Defined Benefit Plan net position decreased by approximately $6.6 billion to $33.6 billion for the year ended December 31, 2022, compared to an increase of approximately $5.2 billion for the year ended December 31, 2021. The decrease in 2022 was mainly attributable to negative investment returns, decreased employer contributions, and increased benefit payments.

- The Defined Contribution Plan opened for enrollment on January 1, 2019, and continues to grow. The net position for the Defined Contribution Plan was approximately $105.8 million as of December 31, 2022, which is an increase of approximately $27.8 million from the December 31, 2021, net position of $78.0 million. The increase is attributed to contributions and funding from employers, exceeding the investment losses and deductions of the plan.

- See Condensed Financial Information tables on page 13 for consolidated Defined Benefit Plan and Defined Contribution Plan information.

- On December 29, 2022, the SECURE 2.0 Act of 2022 was signed into law by the President of the United States of America. SECURE 2.0 contains several retirement-savings provisions intended to offer more flexibility to those saving for retirement. Certain provisions of SECURE 2.0 are effective starting January 1, 2023, while other provisions will take effect in future years. SERS management will be analyzing SECURE 2.0 to determine its impact.

- SERS reviews all new Governmental Accounting Standards Board (GASB) pronouncements and assesses their potential impact on SERS reporting. For the years ended December 31, 2022 and 2021, there were no new GASB standards that materially impacted SERS.

### The Defined Benefit Plan

The Defined Benefit Plan is a traditional pension plan defined by IRC section 401(a). This plan requires mandatory contributions from both the member and employer. SERS invests the contributions to achieve returns to help ensure sufficient funds are available to make required payments to current and future retirees.

### Member Contributions

Member contributions were approximately $419 million for the year ended December 31, 2022, $405 million for the year ended December 31, 2021, and $410 million for the year ended December 31, 2020. The increase in contributions in 2022, was mainly due to an increase in gross salaries. Contributions were down in 2021 due to a decrease in gross salaries and overall active membership, with an increase in the newer membership classes that pay into the plan at a lower contribution rate than legacy members. The member contribution rate is set by statute and is 6.25% of gross salary for most members, with a majority of newer members contributing less into the plan at 5%.

Most members hired since 2011 are subject to shared-risk and shared-gain adjustments to their contributions. December 31, 2022 marked the end of the most recent testing period, with overall results being that there is no change in the member contribution rates effective July 1, 2023.

### Employer Contributions

Employer contributions were approximately $2.1 billion, $2.9 billion, and $3.2 billion for the

years ended December 31, 2022, 2021, and 2020, respectively. The 2022 contributions represented a decrease of $796 million, or 28%, compared to 2021. Similarly, the 2021 contributions represented a decrease of $315 million, or 10%, compared to 2020. The decreases in contributions were mainly due to lower one-time lump sum contributions under Act 2019-105 between 2020 and 2021 and no lump sum payments being made in 2022, as well as the usage of associated set off credits. Despite the overall decreases in contributions, normal employer contributions were up due to an increase in gross salaries and an increase to the composite employer contribution rate from 33.48% to 33.81% on July 1, 2021 and from 33.81% to 34.16% on July 1, 2022.

Beginning in 2005, Pennsylvania law statutorily suppressed employer contribution rates, primarily through Acts 2003-40 and 2010-120. Act 2010-120 limited the rate at which employer contributions increased in any given year after fiscal year (FY) 2011-12, up to a maximum of 4.5% each year, until rate collars were no longer needed. Under this schedule, commonwealth FY 2017-18 was the first year since legislatively mandated contribution rates were enacted through Act 2010-120 that collars were no longer needed and employers paid the uncollared rate. Since FY 2017-18, employers continued to show commitment by making contributions to the Defined Benefit Plan at the actuarially required rate. The FY 2023-24 composite employer contribution rate is expected to be 35.32% of payroll.

While the above-noted suppressed employer contributions have provided budgetary relief to commonwealth agencies and the taxpayers of Pennsylvania, they are a factor influencing the pension liability. The short-term benefit, however, has resulted in the need for employers to contribute more over a 30-year period due to implied financing costs. Such financing costs are incurred because the monies were not available to invest and compound.

From 2003 through 2022, employer contributions totaled $21.5 billion, or 31%, of total additions to fiduciary net position, compared to $7.2 billion, or 11%, of total additions attributed to member contributions, and $40.0 billion, or 58%, of total additions attributed to investment earnings, as illustrated in the following charts.

**20-Year Cumulative Additions to Fiduciary Net Position**

($ billions)




**20-Year Cumulative Additions to Fiduciary Net Position**




**Net Investment Income**

SERS utilizes two methodologies when analyzing Defined Benefit Plan investment returns. The two approaches may vary from each other in any given period based on the underlying methodology used. For GASB 67 accounting valuation purposes, a money-weighted return is used. A money-weighted rate of return calculates the investment performance accounting for all cash flows (contributions and withdrawals) occurring during the performance measurement period. Conversely,

for investment performance reporting purposes, SERS and its investment consultants rely on a time-weighted approach. A time-weighted rate of return minimizes the impact of cash flows occurring throughout the measurement period. Defined Benefit Plan investment returns, net of manager fees, on a money-weighted basis, were -12.2%, 17.2%, and 11.3% for the years 2022, 2021, and 2020, respectively. Defined Benefit Plan investment returns, net of manager fees, on a time-weighted basis were -12.2%, 17.2%, and 11.1% for the years 2022, 2021, and 2020, respectively.

Negative investment returns contributed to the $5.2 billion net investment loss in 2022. Positive investment returns contributed to the $5.7 billion and $3.9 billion net investment income in 2021 and 2020, respectively.

SERS has reviewed and modified the Defined Benefit Plan's strategic investment plan, as necessary. In December 2019, the SERS Board adopted the *SERS Defined Benefit Plan Investment Policy Statement*. Its purpose is to outline the investment philosophy and practices of SERS and serve as the governing policy for the management of the system's defined benefit assets. In addition, the board moved to adopt the policy target asset allocation set forth in the statement. The target asset allocation is projected to reduce investment management fees and maintain an adequate level of liquid assets. The target asset allocation is used to support the Defined Benefit Plan's long-term return assumption. The purpose of maintaining an adequate amount of liquid assets is to maintain a level of funds sufficient to pay retirement benefits and obligations during prolonged periods of market decline and potential budgetary constraints. This is especially important for a mature pension plan like SERS. The *SERS Defined Benefit Plan Investment Policy Statement* has been amended several times throughout 2020, 2021, and 2022.

SERS assets are managed by external investment managers hired by the SERS Board. SERS strives to engage the highest quality investment managers for the most cost-effective price. Many of these managers are paid a fee based on the amount of assets under management. For private market investments, the industry practice is for the limited partners to pay fees to the general partner based on commitments to the partnership during the investment period.

The Defined Benefit Plan pays the majority of its fees to managers within its Private Equity and Real Estate asset classes due to the complex and time-consuming nature of managing the investments.

Defined Benefit Plan investment expenses, which include fees paid to managers, were $157 million and $172 million for the years ended December 31, 2022 and 2021, respectively.

### Benefits, Refunds, and Expenses

Benefit payments to annuitants are the most significant recurring deductions from the fiduciary net position. During 2022 and 2021, the SERS Defined Benefit Plan paid out approximately $3.9 billion and $3.7 billion in benefits and refunds, respectively. Approximately 90% of benefit payments are made to annuitants residing in Pennsylvania.

There were approximately 6,100 new retirees added to the annuity payroll in 2022, with an average annual benefit of $30,900. There were approximately 6,000 new retirees added to the annuity payroll in 2021, with an average annual benefit of $32,000. There were more than 4,800 and 5,000 retirees removed from the rolls with an average annual benefit of $18,400 and $18,000 in 2022 and 2021, respectively. As is typical in mature pension plans, new retirees in 2022 received a higher annual benefit than those removed from the annuity payroll.

The benefits expense on the Defined Benefit Plan's financial statements consists of two components. A majority of the payments relate to normal monthly annuity payments, with a lesser portion related to supplemental payments. Most of the supplemental payments were paid to retiring members who chose to withdraw their contributions and interest at retirement. Such withdrawals reduce the retirees' annuity payments over their remaining life.

## Management's Discussion and Analysis

**December 31, 2022 and 2021 (unaudited)**

Supplemental payments were $500 million and $465 million for 2022 and 2021, respectively.

Act 2010-120 lowered the benefits earned by most employees who joined SERS on or after January 1, 2011, through December 31, 2018, by reducing the retirement benefit accrual rate, increasing normal retirement age, extending the vesting period from five years to 10 years, and other provisions. Another important benefit-related aspect of Act 2010-120 was that retirement provisions for legislators elected after December 1, 2010 were reduced and made consistent with those of most rank-and-file employees.

Act 2017-5 further lowered and fundamentally changed the benefits earned by most employees who joined SERS on or after January 1, 2019, by introducing a hybrid benefit. One portion of the employee's retirement benefit comes from the Defined Benefit Plan that features guaranteed monthly payments for life based on a calculation. The other portion comes from the Defined Contribution Plan which is based on the employer and employee contributions and the amount of money the employee generates from their investment choices and market performance. Employees have the option to elect to exclusively participate in the Defined Contribution Plan, as opposed to a hybrid benefit. Act 2017-5 further reduced the retirement benefit accrual rate and increased the normal retirement age under the Defined Benefit Plan. The accrual rate is determined by the employee's class of service.

It will take considerable time to realize savings from Act 2010-120 and Act 2017-5 as detailed above. SERS expects benefit expenses to rise steadily because the number of retirees added to the rolls is projected to outpace the number of retirees removed from the rolls. Additionally, despite the benefit cost reductions for new employees, the monthly annuities for retirees in the near-term are projected to be approximately 68% higher than the annuities of those being removed from the payrolls.

SERS was established in 1923, but did not pay more than $1 billion in annual benefits until 1997. SERS' Defined Benefit Plan annual benefit payments reached $2 billion in 2007 and $3 billion in 2015. Based on recent actuarial projections, the SERS Defined Benefit Plan annual benefit payments will reach $4 billion by 2025.

### Growth in Annuity Payroll

| | December | | |
|---|---|---|---|
| | **2022** | **2021** | **2020** |
| Monthly annuity payroll ($ millions) | $283 | $274 | $266 |
| Retirees | 135,647 | 134,360 | 133,334 |

SERS' administrative expenses represented 0.1% of fiduciary net position in 2022 and 2021. All expenses were within budget.

### SERS' Assets

Investments are the most significant component of SERS' assets. The total Defined Benefit Plan investment portfolio fair value was $33.9 billion for 2022, as compared to $40.3 billion for 2021. The decrease in SERS' total investments is due to the investment losses of 12.2% combined with benefit payments and expenses exceeding contributions. SERS reports investments at fair value as discussed in accounting policies note 2(c) to the financial statements. Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

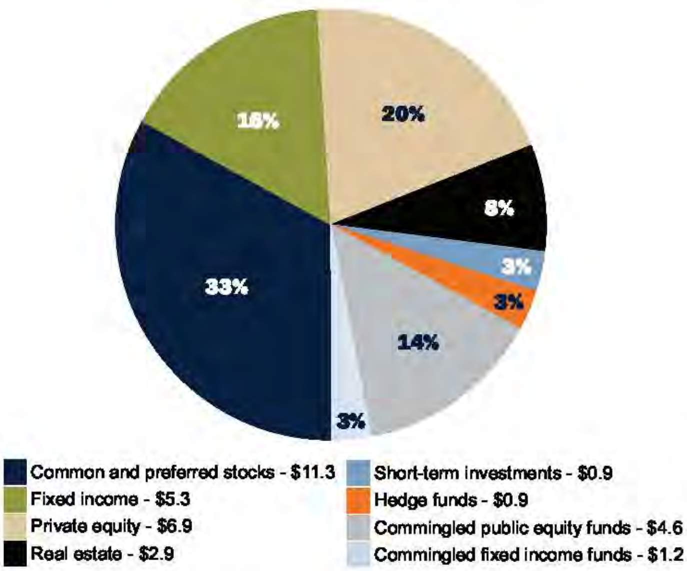
Common and preferred stock values decreased to $11.3 billion for 2022, from $13.6 billion in 2021. Commingled public equity values decreased to $4.6 billion for 2022, from $5.5 billion in 2021. The decrease in equity was primarily due to negative investment returns. Fixed income values decreased to $5.3 billion for 2022, from $7.0 billion in 2021. Commingled fixed income fund values were approximately $1.2 billion for 2022 and $1.7 billion for 2021. The net decrease in fixed income is due to a combination of the negative investment returns and liquidations taking place to align with lower asset allocation targets. Private equity values decreased to $6.9 billion for 2022, from $7.4 billion

in 2021. The decrease in private equity was primarily due to negative investment returns.

The total investment portfolio fair value of $33.9 billion for 2022 was composed as shown by the chart below:

**Investments at Fair Value (2022)**

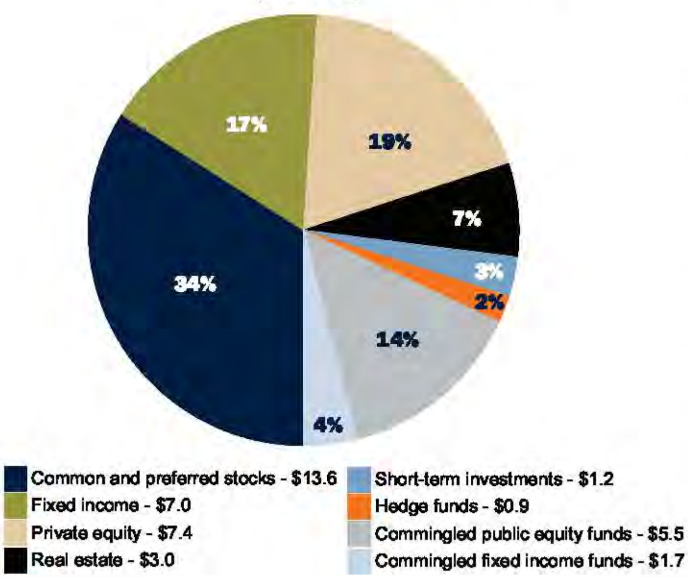
($ billions)




The total investment portfolio fair value of $40.3 billion for 2021 was composed as shown by the chart below:

**Investments at Fair Value (2021)**

($ billions)




SERS earns additional investment income by lending investment securities to brokers. The brokers provide collateral to SERS for borrowed securities generally equal to 102% to 105% of the borrowed securities, and SERS invests the collateral to earn interest. Income, net of expenses, from securities lending is dependent on the volume of lending generated at the custodian bank and the spreads (profits) on loaned securities.

SERS' Defined Benefit Plan earned approximately $39 million through securities lending over the last 10 years. The program's guidelines provide for investment of cash collateral in highly liquid, highly-rated securities. As of December 31, 2022 and 2021, the fair value of loaned securities was $497 million and $665 million, respectively. The fair value of the associated collateral was $513 million and $684 million, respectively, of which $190 million and $241 million was cash, respectively.

## Derivatives

SERS' Defined Benefit Plan permits investment managers to use derivatives to hedge risks and provide market exposure to various asset classes within narrowly prescribed policy guidelines. Used properly, such derivatives cost-efficiently provide exposures in the respective asset classes without disrupting Defined Benefit Plan liquidity needs. SERS' Defined Benefit Plan investment managers manage counterparty credit risk by entering into contracts with parties with credit ratings of at least investment grade and by establishing collateral requirements. SERS monitors derivative levels and types to ensure that portfolio derivatives are consistent with their intended purpose and at the appropriate level.

## Liquidity

SERS' investment policy utilizes Cash as an asset class that serves as the primary source of short-term liquidity for the Defined Benefit Plan. At December 31, 2022 and 2021, the Defined Benefit Plan held approximately $0.6 billion and $0.9 billion in Cash, respectively, which is included in short-term investments on the Statements of

Fiduciary Net Position. Specific short-term investments and fixed income holdings also offer liquidity. These investments provide a stable source for meeting the cash flow needs of the plan and protect against the risk that equity or other investments would need to be liquidated at unfavorable values in order to pay member benefits. Having adequate liquidity levels is especially vital for a mature pension plan that has growing benefit payments that exceed contributions into the plan.

### Actuarial Valuations

Annually, the SERS Defined Benefit Plan obtains two actuarial valuations, one for financial reporting purposes under GASB 67 and one that is statutorily required for funding purposes. The funding valuation is used to set the employer contribution rate for the plan.

Every five years, the SERS Defined Benefit Plan is required to conduct an actuarial experience study to determine whether the assumptions used in its annual actuarial valuations remain accurate based on current and anticipated demographic trends and economic conditions.

The actuary, under oversight of the SERS Board, reviews economic assumptions (such as the assumed future investment returns and salary increases) as well as demographic assumptions (such as employee turnover, retirement, disability, and death rates). The *19th Investigation of Actuarial Experience* covering the period 2015 - 2019 was released and approved by the SERS Board in July 2020.

The study recommended decreasing the investment rate of return and inflation assumptions, reducing rates of career salary growth, more favorable annuitant mortality assumptions, and several other changes. The assumptions from this study were effective with the December 31, 2020 valuation going forward unless changed by the SERS Board.

SERS experience studies can be viewed at www.SERS.pa.gov.

It is important to note differences in actuarial methods for financial reporting under GASB 67 (accounting valuation) compared to those used for funding purposes (funding valuation). Under the funding valuation, current investment gains and losses are deferred and smoothed into assets over five years (actuarial value of assets) as opposed to being recognized immediately in the fiduciary net position balance (market value of assets) of each respective year under the accounting valuation. 2020 and earlier funding valuations were based on a statutorily required modified entry-age funding method. This method calculated employer normal costs based upon the cost of new hires only. Act 2017-5 required SERS to convert to the traditional entry-age funding method beginning with 2021, which brings it in line with the accounting valuation. The traditional entry-age funding method calculates employer normal costs based on a blend of all active members in the system in that year, rather than only on new hires.

Key valuation results for the accounting valuation compared to the funding valuation for the years ended December 31, 2022 and 2021 are as shown in the following tables:

### As of December 31, 2022

($ millions)

| GASB 67 - Accounting Valuation | | Funding Valuation | |
|---|---|---|---|
| Total Pension Liability (TPL) | $54,622 | Actuarial Accrued Liability (AAL) | $54,614 |
| Fiduciary Net Position | 33,607 | Actuarial Value of Assets | 37,125 |
| **Net Pension Liability (NPL)** | **$21,015** | **Unfunded AAL** | **$17,489** |
| Ratio - Fiduciary Net Position/TPL | 61.5% | Funded Ratio | 68.0% |

### As of December 31, 2021

($ millions)

| GASB 67 - Accounting Valuation | | Funding Valuation | |
|---|---|---|---|
| Total Pension Liability (TPL) | $52,936 | Actuarial Accrued Liability (AAL) | $52,927 |
| Fiduciary Net Position | 40,231 | Actuarial Value of Assets | 36,847 |
| **Net Pension Liability (NPL)** | **$12,705** | **Unfunded AAL** | **$16,080** |
| Ratio - Fiduciary Net Position/TPL | 76.0% | Funded Ratio | 69.6% |

Under the accounting valuation, the net pension liability increased to $21.0 billion in 2022 from $12.7 billion in 2021. This was due to a $6.6 billion decrease in the fiduciary net position mostly due to investment losses and benefit payments exceeding contributions. In addition, there was a $1.7 billion increase in the total pension liability due to changes in the investment return assumption, service costs, and interest costs, offset by benefit payments and refunds of contributions. In June 2022, the board approved a reduction in the investment return assumption from 7.0% to 6.875%, which was effective with the December 31, 2022, valuation.

Under the funding valuation, the unfunded actuarial accrued liability increased to $17.5 billion in 2022 from $16.1 billion in 2021 due to mostly the same factors as discussed above, except the effect of current year investment loss being not as impactful because of asset smoothing.

### The Defined Contribution Plan

On June 12, 2017, Governor Wolf signed Act 2017-5 into law. The law established two new side-by-side hybrid defined benefit/defined contribution benefit options and a new defined contribution-only option for all state employees, excluding most hazardous duty employees, who first enter SERS membership on or after January 1, 2019. Additionally, all legacy SERS members had a one-time, irrevocable option to select one of the three new retirement benefit options.

While new employees are automatically enrolled in the hybrid Defined Benefit/Defined Contribution Plan A-5 class of service, they have the option to elect the other hybrid Defined Benefit/Defined Contribution Plan option A-6 class of service, or to join the stand-alone Defined Contribution Plan option. The Defined Contribution Plan, for all options, has three-year vesting for employer contributions and immediate vesting for employee contributions.

The SERS Board selects the investment options offered through the Defined Contribution Plan, and contracts with investment managers and with a third-party administrator (TPA) for the plan. The employee defined contribution accounts are maintained by the TPA. Employee and employer contributions for the Defined Contribution Plan are deposited into participants' individual investment accounts. Employees may invest their money in several investment options including a range of target date funds, equity funds, fixed income funds, a short-term investment fund, and the self-directed brokerage option. If no active selection is made, contributions will be defaulted into one of the target date funds. Most participants are invested in the target date funds. The benefit to which a participant is entitled to is their vested account balance at termination. Distribution of benefits can be made in installments, lump sum payments, or through an annuity.

The Defined Contribution Plan continues to grow. There were approximately 25,300 and 18,700 defined contribution accounts as of December 31, 2022 and 2021, respectively. The net position of the Defined Contribution Plan was approximately $105.8 million as of December 31, 2022, and $78.0 million as of December 31, 2021. Employee contributions were approximately $31.4 million for the year ended December 31, 2022, and $22.5 million for the year ended December 31, 2021.

Employer contributions were approximately $16.8 million for the year ended December 31, 2022, and approximately $11.4 million for the year ended December 31, 2021. Net investment loss was approximately $14.0 million for the year ended December 31, 2022, and a gain of $7.5 million for the year ended December 31, 2021. The plan distributed approximately $3.0 million in benefits and refunds for the year ended December 31, 2022, and $1.7 million for the year ended December 31, 2021.

All fees, costs, and expenses of administering the plan were paid by commonwealth appropriations until FY 2020-21. At that time, an annual per-participant charge was implemented and charged to employers to cover the administrative costs. Additionally, Act 2020-94 allowed the plan to retain all unvested employer contributions after June 30, 2020, to offset administrative costs of the plan. Prior to Act 2020-94, the unvested employer contribution monies were set aside for employers to use to offset future contributions to the plan.

Currently, the fees, costs, and expenses of administering this plan are funded by participating employers through the per-particpant charge and unvested employer contributions occurring after June 30, 2020. There is no administrative charge to participants. Approximately $1.3 million and $1.7 million was received in 2022 and 2021, respectively, for the annual employer charge; and $3.8 million and $3.3 million of unvested employer contributions were available for administrative costs as of December 31, 2022 and 2021, respectively. Combined, these funds helped to pay expenses totaling approximately $4.6 million and $4.0 million for the years ended December 31, 2022 and 2021, and respectively.

### Pennsylvania Act 2019-105

Governor Wolf signed House Bill 1982 into law as Act 2019-105 on November 27, 2019. The law allows eligible employers to enter into an agreement with the SERS Board to make a one-time lump sum payment of 75% to 100% of their respective unfunded accrued liability. SERS' actuaries will calculate the portion of the unfunded accrued liability that an eligible employer is liable for based on SERS' most recent valuation report. The eligible employer will receive credit against future actuarially determined contributions on a periodic basis that coincides with its existing schedule for making employer contributions to the system. With limited exceptions, this schedule is fixed once it is set. The lump sum payment covers only liabilities accrued as of the date of the calculation. Future changes in liability, whether gains or losses, will attach to the employer as if the advance payment was not made. Agreements must be entered into by December 31, 2024, and the lump sum payments must be made by May 1, 2025.

In April 2020, Penn State University paid a one-time lump sum contribution of $1.06 billion toward its unfunded liability. In April 2021, the Pennsylvania State System of Higher Education became the second employer to make a lump sum contribution under the Act, submitting a payment of $825 million to SERS. In return, each employer receives an annual credit against their contributions over 30 years following a schedule set forth in their respective agreements.

The lump sum payments exclusively benefit the respective employer making the payment and does not impact other employers in the pension plan. These funds are part of the general assets of SERS and will not be segregated or invested separately for the account or benefit of the employers making the payment. These lump sum payments are included as employer contributions on the respective year's Statement of Changes in Fiduciary Net Position.

## Condensed Financial Information

($ millions)

### Fiduciary Net Position

| | 2022 | Increase/ (Decrease) | 2021 | Increase/ (Decrease) | 2020 |
|---|---|---|---|---|---|
| Total investments | $33,977 | ($6,445) | $40,422 | $4,170 | $36,252 |
| Net other assets, liabilities, and deferrals | (264) | (151) | (113) | 1,071 | (1,184) |
| **Net position restricted for pensions and held in trust for defined contribution plan participants** | **$33,713** | **($6,596)** | **$40,309** | **$5,241** | **$35,068** |

### Changes in Fiduciary Net Position

| | 2022 | Increase/ (Decrease) | 2021 | Increase/ (Decrease) | 2020 |
|---|---|---|---|---|---|
| Contributions | $2,542 | ($768) | $3,310 | ($309) | $3,619 |
| Annual employer charge | 1 | (1) | 2 | (3) | 5 |
| Net investment (loss)/income | (5,227) | (10,917) | 5,690 | 1,767 | 3,923 |
| Benefit, refunds, and administrative expenses | 3,912 | 151 | 3,761 | 173 | 3,588 |
| **Net (decrease)/increase in net position restricted for pensions and held in trust for defined contribution plan participants** | **($6,596)** | **($11,837)** | **$5,241** | **$1,282** | **$3,959** |

## Statements of Fiduciary Net Position

### Statement of Fiduciary Net Position

December 31, 2022

($ thousands)

| | Defined Benefit Plan | Defined Contribution Plan | Total |
|---|---|---|---|
| **Assets** | | | |
| Receivables | | | |
| Plan members/participants | $1,592 | $154 | $1,746 |
| Employers | 19,722 | 76 | 19,798 |
| Investment income | 57,612 | 28 | 57,640 |
| Investment proceeds and other receivables | 212,123 | — | 212,123 |
| Miscellaneous | 1,998 | 3 | 2,001 |
| **Total receivables** | **293,047** | **261** | **293,308** |
| Investments | | | |
| Short-term investments | 878,765 | 8,658 | 887,423 |
| Fixed income | 5,258,909 | — | 5,258,909 |
| Common and preferred stocks | 11,338,761 | — | 11,338,761 |
| Hedge funds | 871,809 | — | 871,809 |
| Real estate | 2,850,515 | — | 2,850,515 |
| Private equity | 6,913,933 | — | 6,913,933 |
| Target date funds | — | 88,490 | 88,490 |
| Commingled public equity funds | 4,601,477 | 8,480 | 4,609,957 |
| Commingled fixed income funds | 1,154,876 | 1,536 | 1,156,412 |
| Other investments | 372 | 157 | 529 |
| **Total investments** | **33,869,417** | **107,321** | **33,976,738** |
| Securities lending collateral pool | 189,697 | — | 189,697 |
| Other assets | 23,451 | — | 23,451 |
| **Total assets** | **34,375,612** | **107,582** | **34,483,194** |
| Total deferred outflows - OPEB | 5,167 | 3,202 | 8,369 |
| **Total assets and deferred outflows** | **34,380,779** | **110,784** | **34,491,563** |
| **Liabilities** | | | |
| Accounts payable and accrued expenses | 52,321 | 923 | 53,244 |
| Investment purchases and other liabilities | 479,819 | 171 | 479,990 |
| Obligations under securities lending | 189,697 | — | 189,697 |
| Net OPEB liability | 22,941 | 2,629 | 25,570 |
| Other liabilities | 17,440 | — | 17,440 |
| **Total liabilities** | **762,218** | **3,723** | **765,941** |
| Total deferred inflows - OPEB | 11,354 | 1,270 | 12,624 |
| **Total liabilities and deferred inflows** | **773,572** | **4,993** | **778,565** |
| **Net position restricted for pensions and held in trust for defined contribution plan participants** | **$33,607,207** | **$105,791** | **$33,712,998** |

See accompanying notes to basic financial statements.

## Statement of Fiduciary Net Position

December 31, 2021

($ thousands)

| | Defined Benefit Plan | Defined Contribution Plan | Total |
|---|---|---|---|
| **Assets** | | | |
| Receivables | | | |
| Plan members/participants | $1,660 | $231 | $1,891 |
| Employers | 32,699 | 64 | 32,763 |
| Investment income | 159,548 | 1 | 159,549 |
| Investment proceeds and other receivables | 210,909 | — | 210,909 |
| Miscellaneous | 1,654 | 23 | 1,677 |
| **Total receivables** | **406,470** | **319** | **406,789** |
| Investments | | | |
| Short-term investments | 1,220,882 | 7,958 | 1,228,840 |
| Fixed income | 7,001,155 | — | 7,001,155 |
| Common and preferred stocks | 13,582,828 | — | 13,582,828 |
| Hedge funds | 934,029 | — | 934,029 |
| Real estate | 2,983,453 | — | 2,983,453 |
| Private equity | 7,437,372 | — | 7,437,372 |
| Target date funds | — | 63,914 | 63,914 |
| Commingled public equity funds | 5,526,758 | 6,383 | 5,533,141 |
| Commingled fixed income funds | 1,656,599 | 1,000 | 1,657,599 |
| Other investments | (92) | 88 | (4) |
| **Total investments** | **40,342,984** | **79,343** | **40,422,327** |
| Securities lending collateral pool | 240,978 | — | 240,978 |
| **Total assets** | **40,990,432** | **79,662** | **41,070,094** |
| Total deferred outflows - OPEB | 5,709 | 2,004 | 7,713 |
| **Total assets and deferred outflows** | **40,996,141** | **81,666** | **41,077,807** |
| **Liabilities** | | | |
| Accounts payable and accrued expenses | 51,049 | 1,192 | 52,241 |
| Investment purchases and other liabilities | 433,583 | 1 | 433,584 |
| Obligations under securities lending | 240,978 | — | 240,978 |
| Net OPEB liability | 23,849 | 1,507 | 25,356 |
| **Total liabilities** | **749,459** | **2,700** | **752,159** |
| Total deferred inflows - OPEB | 15,667 | 957 | 16,624 |
| **Total liabilities and deferred inflows** | **765,126** | **3,657** | **768,783** |
| **Net position restricted for pensions and held in trust for defined contribution plan participants** | **$40,231,015** | **$78,009** | **$40,309,024** |

See accompanying notes to basic financial statements.

## Statements of Changes in Fiduciary Net Position

### Statement of Changes in Fiduciary Net Position

Year Ended December 31, 2022

($ thousands)

| | Defined Benefit Plan | Defined Contribution Plan | Total |
|---|---|---|---|
| **Additions** | | | |
| Contributions | | | |
| Plan members/participants | $418,589 | $31,372 | $449,961 |
| Employers | 2,074,999 | 16,750 | 2,091,749 |
| **Total contributions** | **2,493,588** | **48,122** | **2,541,710** |
| Annual employer charge | — | 1,288 | 1,288 |
| Investment (loss)/income | | | |
| From investing activities | | | |
| Net depreciation in fair value of investments | (5,504,938) | (14,102) | (5,519,040) |
| Interest | 171,411 | 127 | 171,538 |
| Dividends | 196,466 | — | 196,466 |
| Real estate income | 76,519 | — | 76,519 |
| Miscellaneous income | 1,849 | — | 1,849 |
| **Total investing activities loss** | **(5,058,693)** | **(13,975)** | **(5,072,668)** |
| Investment expenses | (157,345) | (50) | (157,395) |
| Net loss from investing activities | (5,216,038) | (14,025) | (5,230,063) |
| From securities lending activities | | | |
| Securities lending income | 2,993 | — | 2,993 |
| Securities lending expenses | (299) | — | (299) |
| Net income from securities lending activities | 2,694 | — | 2,694 |
| Net investment loss | (5,213,344) | (14,025) | (5,227,369) |
| **Total additions** | **(2,719,756)** | **35,385** | **(2,684,371)** |
| **Deductions** | | | |
| Benefits | 3,852,073 | 1,886 | 3,853,959 |
| Refunds of contributions | 32,953 | 1,116 | 34,069 |
| Administrative expenses | 19,026 | 4,601 | 23,627 |
| **Total deductions** | **3,904,052** | **7,603** | **3,911,655** |
| Net (decrease)/increase | (6,623,808) | 27,782 | (6,596,026) |
| Net position restricted for pensions and held in trust for defined contribution plan participants | | | |
| Balance, beginning of year | 40,231,015 | 78,009 | 40,309,024 |
| **Balance, end of year** | **$33,607,207** | **$105,791** | **$33,712,998** |

See accompanying notes to basic financial statements.

## Statement of Changes in Fiduciary Net Position

Year Ended December 31, 2021

($ thousands)

| | Defined Benefit Plan | Defined Contribution Plan | Total |
|---|---|---|---|
| **Additions** | | | |
| Contributions | | | |
| Plan members/participants | $405,138 | $22,533 | $427,671 |
| Employers | 2,871,253 | 11,440 | 2,882,693 |
| **Total contributions** | **3,276,391** | **33,973** | **3,310,364** |
| Annual employer charge | — | 1,696 | 1,696 |
| Investment income | | | |
| From investing activities | | | |
| Net appreciation in fair value of investments | 5,396,397 | 7,499 | 5,403,896 |
| Interest | 204,996 | 4 | 205,000 |
| Dividends | 159,733 | — | 159,733 |
| Real estate income | 87,796 | — | 87,796 |
| Miscellaneous income | 4,231 | — | 4,231 |
| **Total investing activities income** | **5,853,153** | **7,503** | **5,860,656** |
| Investment expenses | (172,375) | (33) | (172,408) |
| Net income from investing activities | 5,680,778 | 7,470 | 5,688,248 |
| From securities lending activities | | | |
| Securities lending income | 1,891 | — | 1,891 |
| Securities lending expenses | (189) | — | (189) |
| Net income from securities lending activities | 1,702 | — | 1,702 |
| Net investment income | 5,682,480 | 7,470 | 5,689,950 |
| **Total additions** | **8,958,871** | **43,139** | **9,002,010** |
| **Deductions** | | | |
| Benefits | 3,705,674 | 783 | 3,706,457 |
| Refunds of contributions | 25,469 | 868 | 26,337 |
| Administrative expenses | 24,443 | 3,971 | 28,414 |
| **Total deductions** | **3,755,586** | **5,622** | **3,761,208** |
| Net increase | 5,203,285 | 37,517 | 5,240,802 |
| Net position restricted for pensions and held in trust for defined contribution plan participants | | | |
| Balance, beginning of year | 35,027,730 | 40,492 | 35,068,222 |
| **Balance, end of year** | **$40,231,015** | **$78,009** | **$40,309,024** |

See accompanying notes to basic financial statements.

## (1) Organization and Description of Pennsylvania State Employees' Retirement System (SERS)

### (a) Organization

SERS was established as of June 27, 1923, under the provisions of Public Law 858, No. 331. SERS was developed as an independent administrative agency of the board, which exercises control and management of SERS, including the investment of its assets. The SERS Board has 11 members including the State Treasurer (ex officio), the Secretary of Banking and Securities (ex officio), two Senators, two members of the House of Representatives, and five members appointed by the Governor, one of whom is an annuitant of SERS. At least five board members must be active members of SERS and at least two must have 10 or more years of credited service.

SERS is the administrator of the State Employees' Retirement Fund (Defined Benefit Plan or pension plan), which is a cost-sharing multiple employer defined benefit pension plan. SERS is also the administrator of the State Employees' Defined Contribution Plan, which was established as part of Act 2017-5. The Defined Contribution Plan opened for enrollment on January 1, 2019. Both the Defined Benefit Plan and Defined Contribution Plan were established by the Commonwealth of Pennsylvania (commonwealth) to provide retirement benefits for employees of state government and certain independent agencies. The Defined Benefit and Defined Contribution Plans operate under separate trusts.

SERS is a component unit of the commonwealth, and the Defined Benefit and Defined Contribution Plans are included in the commonwealth's financial report as pension trust funds.

Membership in SERS is mandatory for most state employees. Members and employees of the General Assembly, certain elected or appointed officials in the executive branch, department heads, and certain employees in the field of education are not required but are given the option to participate.

Participation in the Defined Benefit Plan includes 38 employers with the commonwealth being classified as its largest employer. The commonwealth comprises 64 agencies and when everything is evaluated separately, the Defined Benefit Plan has a total of 101 participating employers/agencies as of December 31, 2022 and 2021, respectively.

Participation in the Defined Contribution Plan includes 20 employers and the commonwealth is classified as its largest employer. The commonwealth comprises 59 agencies and when everything is evaluated separately, the Defined Contribution Plan has a total of 78 participating employers/agencies as of December 31, 2022. As of December 31, 2021, participation in the Defined Contribution Plan included 21 employers. The commonwealth comprised 57 agencies and when everything was evaluated separately, the Defined Contribution Plan had a total of 77 participating employers/agencies. Additional employers/agencies will join the Defined Contribution Plan as they hire employees who are mandated to be in the plan. At December 31, 2022 and 2021, SERS' membership consisted of the following:

**SERS Membership**

| | 2022 | 2021 |
|---|---|---|
| **Defined Benefit Plan** | | |
| Inactive plan members or beneficiaries currently receiving benefits | 135,647 | 134,360 |
| Inactive plan members entitled to but not yet receiving benefits | 7,188 | 7,237 |
| Active plan members | 96,395 | 97,857 |
| **Total members** | **239,230** | **239,454** |
| **Defined Contribution Plan** | | |
| Inactive accounts | 7,595 | 5,266 |
| Active participants contributing to plan | 17,711 | 13,441 |
| **Total participants** | **25,306** | **18,707** |

As a result of the hybrid benefit structure established by Act 2017-5, certain employees may be included in both the defined benefit and defined contribution figures above.

**(b) Defined Benefit Plan Benefits**
The SERS Defined Benefit Plan provides retirement, death, and disability benefits. Cost of Living Adjustments (COLA) are provided ad hoc at the discretion of the General Assembly. Article II of the Commonwealth of Pennsylvania's Constitution assigns the authority to establish and amend the benefit provisions of the pension plan to the General Assembly. Member retirement benefits are determined by taking years of credited service multiplied by the final average salary multiplied by the annual accrual rate.

Most employees who entered SERS membership prior to January 1, 2011, and who retire at age 60 with three years of service, or at any age with 35 years of service, are entitled to a full retirement benefit. Members of the General Assembly and certain employees classified in hazardous duty positions can retire with full benefits at age 50, with at least three years of service. Act 2010-120 preserved all benefits in place for members but mandated a number of benefit reductions for new members effective January 1, 2011, through December 31, 2018. Act 2010-120 created a class of service in which members earn a benefit that accrues at 2% of the member's final average salary instead of 2.5% each year and vests in 10 years instead of five. The full retirement age is 65 for most employees who entered SERS membership after January 1, 2011, and age 55 for members of the General Assembly and certain employees classified in hazardous duty positions. Act 2017-5 changed the benefit structure for most new employees effective January 1, 2019, which created two hybrid plan options as well as a defined contribution-only plan option. The two hybrid plan options contain a Defined Benefit Plan component with a full retirement age of 67 that accrues at 1.25% or 1% of the member's final average salary.

Most members of SERS, and all state employees hired after June 30, 2001, and prior to January 1, 2011 (except state police officers and certain members of the judiciary and legislators), are Class AA members. Each class of benefits is based on a multiple of the base accrual rate of 2%, which is called the multiplier. The multiplier for Class AA is 1.25, which translates into an annual benefit of 2.5% of the member's highest three-year average salary multiplied by years of service and became effective for members July 1, 2001. The general annual benefit for Class A members is 2% of the member's highest three-year average salary multiplied by years of service.

State police are entitled to a benefit equal to a percentage of their highest annual salary, excluding their year of retirement. The benefit is 75% of salary for 25 or more years of service and 50% of salary for 20-24.99 years of service. Judges are entitled to a benefit of 4% of final average salary for each of the first 10 years of service and 3% for subsequent years. Magisterial District Judges are entitled to a benefit of 3% of final average salary for each year of service.

Legislators taking office before December 1, 2010, are Class D-4. The multiplier for Class D-4 is 1.5, which translates into an annual benefit of 3% of the final average salary for each year of service.

Act 2010-120 created an A-3 class of service and an optional A-4 class for most employees who enter SERS membership for the first time on or after January 1, 2011, and December 1, 2010, for legislators newly elected in November 2010, through December 31, 2018. On or after January 1, 2019, class A-3 is only offered to hazardous duty employees. Employees who enter SERS membership under Act 2010-120 enter as members of the A-3 class with a 45-day window to elect membership in the optional A-4 class. The general annual benefit for Class A-3 members is 2% of the member's highest three-year average salary multiplied by years of service, while the Class A-4 benefit accrual rate is 2.5%.

Act 2017-5 created a new A-5 hybrid class of service with optional hybrid A-6 class and straight defined contribution-only plan options for state employees (excluding most hazardous duty employees), who first enter SERS membership on or after January 1, 2019. Employees who enter SERS membership under Act 2017-5 enter as

members of the A-5 class with a 45-day window to elect membership in the optional A-6 class or straight Defined Contribution Plan. The general annual benefit for Class A-5 members is 1.25% of an average of the highest five calendar years of the member's salary multiplied by years of service, while the Class A-6 benefit accrual rate is 1%. Those members choosing the straight Defined Contribution Plan do not have a benefit accrual rate and retire with their contributions, employer contributions, if vested, and any investment gains on those contributions.

According to the State Employees' Retirement Code (retirement code), all obligations of SERS will be assumed by the commonwealth, should SERS terminate.

**(c) Defined Benefit Plan Contributions**
SERS' retirement code (71 Pa. C.S.) requires that all SERS participating employers make contributions to the pension plan on behalf of all active members and annuitants necessary to fund the liabilities and provide the annuity reserves required to pay benefits. The SERS Defined Benefit Plan funding policy, as set by the board, provides for periodic active member contributions at statutory rates. The Defined Benefit Plan funding policy also provides for periodic employer contributions at actuarially determined rates based on the Defined Benefit Plan funding valuation, expressed as a percentage of annual retirement covered payroll, such that they, along with employee contributions and an actuarially determined rate of investment return, are adequate to accumulate assets to pay benefits when due. In FY 2017-18, the commonwealth paid the full actuarially required rate after being collared in previous years due to Act 2010-120. At December 31, 2022 and 2021, the composite actuarially determined rate was 34.16% and 33.81%, respectively. Employers may pay individual rates higher or lower than the composite rate based on an employees' class of service. Act 2017-5 includes a savings "plow-back" provision requiring that the annual savings achieved through SERS' benefit changes flow back into the Defined Benefit Plan through the employer contribution rate rather than to other non-pension obligations.

Employer rates are computed based on SERS' fiscal year end of December 31 and applied to employers using the commonwealth's fiscal year beginning the following July 1. Therefore, the employer contribution rates in effect for SERS' full year ended December 31, reflect a blended average of calculated rates. As of December 31, 2022 and 2021, the blended contribution rates were 33.99% and 33.65%, respectively.

The general membership contribution rate for all Class A and Class AA members is 5% and 6.25% of salary, respectively. The general membership contribution rate under Act 2010-120 for A-3 and A-4 members is 6.25% and 9.3% of salary, respectively. The general membership contribution rate under Act 2017-5 for A-5 and A-6 members is 5% and 4% of salary, respectively. The contribution rate for Class D-4 Members of the General Assembly is 7.5%. Judges and Magisterial District Judges have the option of electing special membership classes requiring a contribution of 10% and 7.5%, respectively. All Defined Benefit Plan employee contributions are recorded in individually identified accounts that are credited with interest, calculated at 4% per annum, as mandated by statute. Accumulated employee contributions and credited interest vest immediately and are returned to the employee upon termination of service if the employee is not eligible for other benefits or elects to waive their benefits.

Act 2019-105 was signed into law on November 27, 2019. Act 2019-105 allows eligible employers to enter into an agreement with the SERS Board to make a one-time lump sum payment of 75% to 100% of their respective unfunded accrued liability. This respective unfunded accrued liability is calculated by SERS' actuaries and is based on SERS' most recent valuation report. An annual setoff schedule is also calculated by SERS' actuaries and is equal to the value of the one-time lump sum payment compared to the employer's unfunded accrued liability as of a specified determination date. The eligible employer will then receive credit toward future actuarially determined contributions in periodic amounts specified in this

setoff schedule for up to 30 years following the lump sum payment. The setoff schedule will coincide with the employer's existing schedule for making employer contributions to SERS. With limited exceptions, the setoff schedule is fixed once it is set. The lump sum payment covers only liabilities accrued as of the specified determination date. Future changes in liability, whether gains or losses, will attach to the employer as if the advance payment was not made. Agreements must be entered into by December 31, 2024, and the lump sum payments must be made by May 1, 2025.

In April 2021, the Pennsylvania State System of Higher Education (PASSHE) submitted a payment of $825 million toward its unfunded liability pursuant to Act 2019-105. In return, the education system will receive an annual credit against its contributions for 30 years, beginning with FY 2021-22.

The lump sum payments exclusively benefit the respective employer making the payment and do not impact other employers in the pension plan. These funds are part of the general assets of SERS and will not be segregated or invested separately for the account or benefit of the employers making the payment. As part of the funding valuation, SERS' actuaries added the impact of all future setoff amounts to the unfunded liability when calculating the required contribution rates for all employers. By not recognizing any setoff amounts in this calculation, it allowed the effect of the advanced payments to be allocated only to employers making the payment and have no expected effect on the contributions due from the other employers.

The lump sum payment received from PASSHE is included in employer contributions on the 2021 Statement of Changes in Fiduciary Net Position, and throughout the financial statements where employer contributions are reported for 2021.

**(d) Defined Contribution Plan**

The SERS retirement code requires that all SERS participating employers make contributions to the Defined Contribution Plan on behalf of all active participants. SERS' funding policy, as set by the SERS Board, provides for periodic employer and active participant contributions at statutory rates.

Participants in the A-5 class, A-6 class, and defined contribution-only plan option contribute 3.25%, 3.5%, and 7.5% to the plan, respectively. Participants may also make additional voluntary contributions to the plan. Employers contribute 2.25%, 2%, and 3.5% for participants in the A-5 class, A-6 class, and defined contribution-only plan option, respectively. Employers do not match participant voluntary contributions to the plan. Participants are also permitted to transfer or roll over monies into the plan from other qualified plans.

While participant contributions are immediately vested, the employer contributions are not vested until a participant earns three eligibility points. Eligibility points are generally credited based on hours worked in a calendar year.

If a participant terminates employment before earning three eligibility points, any unvested employer contributions are returned to the Defined Contribution Plan to be used to offset future administrative costs to the plan. These monies are kept in a forfeiture account with the third-party administrator (TPA). There were $3.8 million and $3.3 million in forfeitures available to pay for administrative costs as of December 31, 2022 and 2021, respectively.

Each participant in the Defined Contribution Plan holds an individual account with the plan's TPA. The TPA is paid a fee for administering the plan. This TPA fee, and other administrative fees, costs and expenses are incurred to operate by the plan. Effective with the passage of Act 2020-23, these fees, costs, and expenses are funded through a per-participant assessment charged to employers. This funding mechanism began with FY 2020-21.

Participant accounts are credited with the participant's contributions as well as their employer's contributions and are adjusted for the

investment earnings and investment management expenses associated with the investment options chosen by the participant. Participants can choose to invest their money in any of several investment options including a range of target date funds, equity funds, fixed income funds, a short-term investment fund, and a self-directed brokerage option.

The benefit to which a participant is entitled to is their vested account balance at termination. Distribution of benefits can be made in installments, lump sum payments, or through an annuity. Participants are also permitted to transfer or roll over monies out of the plan into other qualified plans.

## (2) Summary of Significant Accounting Policies

### (a) Basis of Accounting

SERS' financial statements are prepared using the accrual basis of accounting and economic resources measurement focus. Plan member contributions are recognized in the period in which the contributions are due. Employer contributions are recognized when due and the employer has a legal requirement to provide the contributions. Benefits, disbursements, and refunds are recognized when due and payable in accordance with the terms of the plans. Investment purchases and sales are recorded on a trade-date basis.

### (b) Use of Estimates

Management of SERS has made certain estimates and assumptions relating to the reporting of assets and liabilities, and the disclosure of contingent assets and liabilities to prepare these financial statements in conformity with U.S. generally accepted accounting principles. Actual results could differ from those estimates.

### (c) Valuation of Investments

SERS investments are reported at fair value. Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

Defined Benefit Plan common and preferred stocks, real estate securities, and foreign exchange contracts are generally valued based on published market prices and quotations at the close of business from national security exchanges and securities pricing services. U.S. government securities and corporate and foreign bonds and notes are valued based on matrix pricing. Real estate separate accounts are valued using unobservable estimates and appraisals. For the Defined Contribution Plan, target date funds, self-directed brokerage accounts, commingled public equity funds, and commingled fixed income funds are reported at fair value, since these securities are considered actively traded as participants are able to actively buy and sell their interest.

Defined Benefit Plan private equity, certain real estate, hedge funds, commingled public equity funds, and commingled fixed income funds are reported at fair value as estimated and reported by general partners and investment managers, based upon the underlying net asset value (NAV) of the fund or partnership as a practical expedient of fair value. Adjustments are required when SERS expects to sell the investment at a value other than NAV.

The investments in short-term investment funds, including those managed by the treasurer of the commonwealth, are reported at amortized cost. The securities lending collateral pool, which is operated by the securities lending agent, is also accounted for at amortized cost.

Unsettled investment sales are reported as investment proceeds receivable and unsettled investment purchases are reported as investment purchases payable. Investment expenses consist of investment managers' expenses and fees, as well as those expenses directly related to SERS investment operations.

### (d) Other Assets and Other Liabilities on the Statement of Fiduciary Net Position

Other assets consist of an internally developed software capital asset capitalized under Governmental Accounting Standards Board (GASB)

Statement No. 51 and leases capitalized under GASB Statement No. 87. Intangible capital assets are amortized over the useful life of the asset once they are placed into service. Other liabilities represent the liabilities associated with any capitalized leases. Interest and amortization expenses related to capitalized leases are reported within the real estate line on the Schedule of Administrative Expenses.

**(e) Commitments**
As of December 31, 2022 and 2021, SERS' Defined Benefit Plan had contractual commitments totaling approximately $3.2 billion and $3.4 billion, respectively, to fund future private equity and real estate investments over the next several years.

**(f) Federal Income Taxes**
The Internal Revenue Service (IRS) issued a favorable tax determination letter on May 19, 2017, qualifying the Defined Benefit Plan as a Governmental Plan under the Internal Revenue Code (IRC). Therefore, member contributions to SERS are federal income tax deferred.

**(g) Risk Management**
SERS is exposed to various liabilities and risks of loss related to theft or destruction of assets, injuries to employees, and court challenges to fiduciary decisions. SERS is accorded sovereign immunity as an administrative agency of the commonwealth. SERS participates in certain commonwealth pooled insurance programs and requires asset managers to carry certain insurance coverage. SERS is self-insured for fiduciary, director, and officer liability. During the past three fiscal years, SERS insurance settlements did not exceed insurance coverage.

**(h) Interfund Transactions**
Interfund transfers of assets take place on a regular basis between the Defined Benefit Plan and Defined Contribution Plan. Interfund activity is used to properly align expenses with each plan

**(3) Legally Required Reserves**
The retirement code requires the maintenance of the following reserve accounts representing the net position held for future and current benefit payments.

The **Members' Savings Account** accumulates contributions and interest earnings of active employees. Member balances are transferred to the Annuity Reserve Accounts as members retire.

The **State Accumulation Account** accumulates contributions of the employer and the net earnings of the pension plan. Funds are transferred to the Annuity Reserve Accounts as members retire. The amount transferred is actuarially determined. Negative balances represent the amounts transferred to other reserve account balances in excess of accumulated employer contributions and net earnings.

The **Directed Commissions Reserve Account** accumulates the income from the commission recapture program less any investment related administrative expenses. SERS utilizes brokers to rebate a percentage of trade commissions directly to SERS. During the years ended December 31, 2022 and 2021, SERS earned approximately $59,000 and $67,000 of income resulting from the commission recapture program, respectively. During 2022 and 2021, no investment related administrative expenditures were made from the program. These commission reserves can be used to pay for future administrative expenditures.

The **Annuity Reserve Accounts** are the accounts from which all death and retirement benefits and supplemental annuities are paid. The balances in these accounts are actuarially determined.

The **Interest Reserve Account** accumulates all income earned by the pension plan. In addition, all administrative and investment expenses incurred by the pension plan and the board necessary for the operation of SERS are paid from this account. Any balance in this reserve is transferred to the State Accumulation Account at year end.

The **Benefits Completion Plan (BCP) Reserve Account** accumulates all BCP employer contributions and net earnings of the pension plan

less any benefits paid out of the pension plan. Act 2002-234 amended the retirement code that directs the SERS Board to establish and serve as trustee of a retirement benefit plan that is in conformity with IRC Section 415(m), the BCP. The BCP is a separate trust fund established to provide benefits to all annuitants of SERS' Defined Benefit Plan and their survivor annuitants and beneficiaries whose retirement benefit exceeds the IRC Section 415(b) limits. A monthly annuity or death benefit is paid under the BCP only if a corresponding monthly annuity or death benefit is paid from the Defined Benefit Plan to the extent permitted by IRC Section 415(b) and the retirement code.

There were 22 and 31 individuals receiving benefits from the BCP at December 31, 2022 and 2021, respectively.

Account balances at December 31, 2022 and 2021 are as follows:

**Account Balances**

($ thousands)

| | 2022 | 2021 |
|---|---|---|
| Members' savings account | $5,456,160 | $5,414,329 |
| State accumulation and interest reserve accounts | (5,708,543) | 2,142,165 |
| Directed commissions reserve account | 3,761 | 3,703 |
| Annuity reserve accounts | | |
| Annuitants and beneficiaries | 30,124,258 | 29,058,856 |
| State police | 3,673,437 | 3,556,814 |
| Enforcement officers | 50,033 | 49,191 |
| Benefit completion plan reserve account | 8,101 | 5,957 |
| **Total** | **$33,607,207** | **$40,231,015** |

The **State Employees' Defined Contribution Trust** accumulates Defined Contribution Plan participant and employer contributions, investment earnings, and plan expenses. The trust is comprised of individual participant investment accounts and administrative income received to cover plan costs. The assets of the plan are held in trust for the exclusive benefit of the participants and their beneficiaries and may be used for the payment of the fees, costs, and expenses related to the administration of the plan. All fees, costs, and expenses of administering the plan are being assessed to employers as a per-participant charge.

**(4) Investments**

As provided by statute, the SERS Board has exclusive control and management responsibility of the Defined Benefit Plan and the Defined Contribution Plan with full power to invest or select investment options for the respective plans. In exercising its fiduciary responsibility to SERS' collective membership, the SERS Board is governed by the prudent expert rule in establishing investment policy. The prudent expert rule requires the exercise of that degree of judgment, skill, and care under the circumstances then prevailing, which investors of prudence, discretion, and intelligence, who are familiar with such matters, exercise in the management of their own affairs, not in regard to speculation, but in regard to permanent disposition of the funds, considering the probable income to be derived there from, as well as the probable safety of their capital. The SERS Board has adopted *SERS' Defined Benefit Plan Investment Policy Statement* and the *401(a) Defined Contribution Plan Statement of Investment Policy* to formally document investment objectives and responsibilities. These policies, as well as applicable state law, establish guidelines for permissible investments of SERS.

**Fair Value Hierarchy**

SERS measures and records its investments using fair value measurement guidelines established by generally accepted accounting principles. The guidelines use a fair value hierarchy that is broken down into three levels based on inputs that market participants would use in valuing assets and liabilities derived from market data as follows:

- **Level 1 inputs**: are quoted prices in active markets for identical assets or liabilities.

- **Level 2 inputs**: are quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, or other than quoted prices that are observable.
- **Level 3 inputs**: are unobservable inputs used to measure fair value if relevant observable inputs are not available for the asset or liability at the reporting date.

Most common and preferred stocks, real estate securities, foreign exchange contracts, and the Defined Contribution Plan's target date funds, commingled public equity funds, commingled fixed income funds, and self-directed brokerage account are valued using prices quoted in active markets for those securities and are categorized as Level 1. They are marked-to-market daily with changes in fair value recognized as part of investments and investment income.

Most fixed income securities are valued using a matrix pricing technique and are categorized as Level 2. Matrix pricing is used to value securities based on the securities' relationship to benchmark quoted prices and recently printed security specific trading levels.

Value add/opportunistic separately managed accounts (SMA) in real estate, certain fixed income securities, and other securities classified in Level 3 reflect prices, which may use several unobservable inputs, using assumptions based on market methodologies to determine the fair value of investments. A majority of the Level 3 investments are real estate investments where the fair value is determined based on appraisals using discounted cash flows, recent comparable sales, and current market conditions. All SMAs are to be independently appraised not less than once every three years by appraisers who meet specific professional qualifications. The valuation process involves significant judgment and estimating; thus, the value upon sale of an asset may differ from its appraised value.

Certain derivative instruments in the Defined Benefit Plan, such as foreign exchange contracts, interest rate swaps, credit default swaps, and futures, as well as the self-directed brokerage account in the Defined Contribution Plan, are included in other investments in the fair value tables.

At December 31, 2022 and 2021, the Defined Benefit Plan's investments measured at fair value are shown in the following tables.

## Notes to Basic Financial Statements

December 31, 2022 and 2021

### Defined Benefit Plan Investments Measured at Fair Value (2022)

($ thousands)

| | Fair Value | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| **Fixed income** | | | | |
| Government | $3,408,374 | $— | $3,408,374 | $— |
| Corporates | 1,113,124 | — | 1,093,060 | 20,064 |
| Asset- and mortgage-backed securities | 296,596 | — | 296,563 | 33 |
| Private placements | 271,927 | — | 262,198 | 9,729 |
| Sovereign debt | 119,780 | — | 119,780 | — |
| Agencies | 49,108 | — | 49,108 | — |
| **Total fixed income** | **5,258,909** | **—** | **5,229,083** | **29,826** |
| **Equity** | | | | |
| Domestic common and preferred stocks | 10,528,723 | 10,526,187 | 2,536 | — |
| Foreign common and preferred stocks | 810,038 | 810,038 | — | — |
| **Total equity** | **11,338,761** | **11,336,225** | **2,536** | **—** |
| **Real estate** | | | | |
| Value add/opportunistic SMA | 526,808 | — | — | 526,808 |
| Real estate securities | 287,585 | 287,585 | — | — |
| **Total real estate** | **814,393** | **287,585** | **—** | **526,808** |
| **Other investments** | | | | |
| Other investments | 372 | 350 | 22 | — |
| **Total** | **$17,412,435** | **$11,624,160** | **$5,231,641** | **$556,634** |

### Defined Benefit Plan Investments Measured at Fair Value (2021)

($ thousands)

| | Fair Value | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| **Fixed income** | | | | |
| Corporates | $3,110,352 | $— | $3,099,215 | $11,137 |
| Government | 3,027,520 | — | 3,027,520 | — |
| Private placements | 385,261 | — | 374,337 | 10,924 |
| Sovereign debt | 280,623 | — | 280,623 | — |
| Asset- and mortgage-backed securities | 165,233 | — | 164,750 | 483 |
| Agencies | 24,010 | — | 24,010 | — |
| **Total fixed income** | **6,992,999** | **—** | **6,970,455** | **22,544** |
| **Equity** | | | | |
| Domestic common and preferred stocks | 12,644,878 | 12,632,716 | 12,162 | — |
| Foreign common and preferred stocks | 937,744 | 937,744 | — | — |
| **Total equity** | **13,582,622** | **13,570,460** | **12,162** | **—** |
| **Real estate** | | | | |
| Value add/opportunistic SMA | 641,875 | — | — | 641,875 |
| Real estate securities | 377,783 | 377,783 | — | — |
| **Total real estate** | **1,019,658** | **377,783** | **—** | **641,875** |
| **Other investments** | | | | |
| Other investments | (94) | (343) | 249 | — |
| **Total** | **$21,595,185** | **$13,947,900** | **$6,982,866** | **$664,419** |

At December 31, 2022 and 2021, the Defined Contribution Plan's investments measured at fair value are shown in the following tables:

### Defined Contribution Plan Investments Measured at Fair Value (2022)

($ thousands)

| | Fair Value | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| **Target date funds** | | | | |
| Target date funds | $88,490 | $88,490 | $— | $— |
| **Equity** | | | | |
| Commingled public equity funds | 8,480 | 8,480 | — | — |
| **Commingled fixed income funds** | | | | |
| Commingled fixed income funds | 1,536 | 1,536 | — | — |
| **Other investments** | | | | |
| Other investments | 157 | 157 | — | — |
| **Total** | **$98,663** | **$98,663** | **$—** | **$—** |

### Defined Contribution Plan Investments Measured at Fair Value (2021)

($ thousands)

| | Fair Value | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| **Target date funds** | | | | |
| Target date funds | $63,914 | $63,914 | $— | $— |
| **Equity** | | | | |
| Commingled public equity funds | 6,383 | 6,383 | — | — |
| **Commingled fixed income funds** | | | | |
| Commingled fixed income funds | 1,000 | 1,000 | — | — |
| **Other investments** | | | | |
| Other investments | 88 | 88 | — | — |
| **Total** | **$71,385** | **$71,385** | **$—** | **$—** |

In certain circumstances, NAV can be used as a practical expedient of fair value to establish the fair value of an investment that does not have a readily determinable fair value.

Private equity limited partnerships are valued at the NAV of SERS' ownership interest in partnership's capital, which approximates fair value. NAV is determined by the general partners. Private equity limited partnerships produce quarterly capital account statements and are audited at least annually. Since private equity investments in such partnerships are generally illiquid with holding periods lasting three to 10 years, the value realized by SERS upon disposition may differ from estimated values reflected in the financial statements. SERS' private equity investments on the Statement of Fiduciary Net Position are categorized into the following strategies in the Defined Benefit Plan Investments Measured at NAV tables:

- **Buyouts** are investments in established businesses that are undergoing a fundamental change in operations or strategy.
- **Special Situations** are investments in funds that acquire distressed companies or companies in need of restructuring, funds from the secondary market, and funds providing mezzanine financing.
- **Growth Equity** consists of private equity investments in late-stage ventures, minority growth equity, and small buyout strategies.
- **Legacy Private Equity** consists of a consolidation of private equity funds from various sub asset-classes (Buyouts, Special Situations, and Growth Equity) that were not considered part of SERS core investment strategy. These assets are currently being managed by a third-party administrator which provides day-to-day oversight of operations.
- **Legacy Private Credit Funds** are closed-end (drawdown) limited partnership structures, often with a significant contractual cash flow component, with liquidity events in five to 10 years. As of December 31, 2022, SERS no longer has an asset allocation targeting this strategy as a stand-alone asset class. Several funds previously included in the Private Credit asset class were moved to the Special Situations investment strategy. The remaining funds, which are no longer considered part of SERS core investment

strategy, are now classified as Legacy Private Credit. In 2021, these investments were further categorized into the following:

- **Direct Lending** were funds that would lend money to privately held firms, often as part of a private equity-leveraged buyout transaction. These loans tended to be predominantly medium-duration, floating rate, and senior in the capital structure.

- **Diversified Credit** were funds that invested in various credit strategies including specialty lending, niche credit opportunities, mezzanine and other debt securities, credit derivatives, structured credit and structured equity.

- **Distressed Debt** invested in the credit securities of distressed companies or companies in need of restructuring.

Real estate limited partnerships are valued at the NAV of SERS' ownership percentage in partnership's capital. Real estate limited partnerships produce quarterly capital account statements and are audited at least annually. The investment managers use third-party appraisals based on discounted cash flows, recent comparable sales, and current market conditions to arrive at NAV. The appraisal process involves significant judgment and estimating; thus, the value upon sale of an asset may differ from its appraised value.

Because the investments in such partnerships are generally illiquid with holding periods lasting seven to 10 years, the value realized by SERS upon disposition may differ materially from estimated values reflected in the financial statements. The following portions of SERS' real estate investments are valued at NAV:

- **Core/Core Plus** are long-term investments in high-quality real estate that generate returns primarily from stable income producing properties. These are open-ended funds.

- **Value Add/Opportunistic Funds** utilize greater leverage and development strategies relative to core strategies, thereby taking higher risks but demanding higher returns. Returns are primarily generated from capital appreciation from opportunistic investments. Strategies for this category of investing can include niche opportunities that are typically not available in core-style investing. These are closed-end funds.

- **Legacy Real Assets** differ from real estate in that they focus on other real assets other than real estate but maintain the characteristics of collateralization by hard assets and income-producing potential.

Hedge funds are valued by general partners based on information provided by underlying hedge fund investments, third-party administrators, and brokers. Hedge fund investments are valued using NAV of units held at the end of the period based on the fair value of underlying investments. Hedge funds are valued on a monthly basis and are audited at least annually.

Most of the hedge fund investments are being scaled down since they are not part of the current investment strategy. Hedge funds are categorized into the following specific strategies:

- **Opportunistic Fixed Income** are investments that include directional and relative value investments through various structures, excluding closed-end funds, that may include debt securities, credit derivatives and related instruments, and/or multi-sector fixed income funds.

- **Legacy Hedge Funds** includes hedge funds that SERS is no longer actively investing in. The assets are to be sold in an orderly fashion as market conditions dictate.

The Defined Benefit Plan's commingled public equity funds and commingled fixed income funds are pooled investments in multiple securities, with each fund being valued at NAV on a monthly basis. The NAV is calculated using the closing price of the underlying investments, with the total value of the fund being apportioned to SERS based on units of ownership.

At December 31, 2022 and 2021, the Defined Benefit Plan's investments measured at NAV are shown in the following tables:

### Defined Benefit Plan Investments Measured at NAV (2022)

($ thousands)

| | NAV | Unfunded Commitments | Redemption Frequency | Redemption Notice Period |
|---|---|---|---|---|
| **Private equity** | | | | |
| Buyouts | $3,618,468 | $1,371,209 | NA | NA |
| Special Situations | 1,581,492 | 948,567 | NA | NA |
| Growth Equity | 1,102,609 | 264,236 | NA | NA |
| Legacy private credit | 393,968 | 174,356 | NA | NA |
| Legacy private equity | 217,396 | 36,322 | NA | NA |
| **Total private equity** | **6,913,933** | **2,794,690** | | |
| **Real estate** | | | | |
| Core/core plus | 1,273,570 | 21,870 | Quarterly | 60 - 90 days |
| Value add/opportunistic | 762,045 | 426,276 | NA | NA |
| Legacy real assets | 507 | — | Daily | None |
| **Total real estate** | **2,036,122** | **448,146** | | |
| **Hedge funds** | | | | |
| Opportunistic fixed income | 854,588 | — | Quarterly | 95 days |
| Legacy hedge funds | 17,221 | — | See note[1/] | See note[1/] |
| **Total hedge funds** | **871,809** | **—** | | |
| **Commingled public equity funds** | | | | |
| Commingled public equity funds | 4,601,477 | — | Daily | 30 days |
| **Commingled fixed income funds** | | | | |
| Commingled fixed income funds | 1,154,876 | — | Quarterly | 30 days |
| **Total** | **$15,578,217** | **$3,242,836** | | |

[1/]The assets are to be sold in an orderly fashion as market conditions dictate.

### Defined Benefit Plan Investments Measured at NAV (2021)

($ thousands)

| | NAV | Unfunded Commitments | Redemption Frequency | Redemption Notice Period |
|---|---|---|---|---|
| **Private equity** | | | | |
| Buyouts | $3,682,734 | $1,372,001 | NA | NA |
| Growth equity | 1,498,827 | 239,993 | NA | NA |
| Special situations | 678,861 | 503,500 | NA | NA |
| Legacy private equity | 505,879 | 58,642 | NA | NA |
| Diversified credit | 438,047 | 434,904 | NA | NA |
| Direct lending | 341,730 | 220,318 | NA | NA |
| Distressed debt | 291,294 | 144,663 | NA | NA |
| **Total private equity** | **7,437,372** | **2,974,021** | | |
| **Real estate** | | | | |
| Core/core plus | 1,257,648 | 21,869 | Quarterly | 60 - 90 days |
| Value add/opportunistic | 706,000 | 441,001 | NA | NA |
| Legacy real assets | 147 | — | Daily | None |
| **Total real estate** | **1,963,795** | **462,870** | | |
| **Hedge funds** | | | | |
| Opportunistic fixed income | 912,490 | — | Quarterly | 95 days |
| Legacy hedge funds | 21,539 | — | See note[1/] | See note[1/] |
| **Total hedge funds** | **934,029** | **—** | | |
| **Commingled public equity funds** | | | | |
| Commingled public equity funds | 5,526,758 | — | Daily | 30 days |
| **Commingled fixed income funds** | | | | |
| Commingled fixed income funds | 1,656,599 | — | Quarterly | 30 days |
| **Total** | **$17,518,553** | **$3,436,891** | | |

[1/]The assets are to be sold in an orderly fashion as market conditions dictate.

SERS also has investments that are valued using methods other than fair value or NAV. SERS owns a portion of the commonwealth Treasury Department's short-term investment fund (STIF). SERS' portion of STIF is valued at amortized cost. Additionally, in 2021, SERS had other investments that were carried at cost.

At December 31, 2022 and 2021, the Defined Benefit and Defined Contribution Plans' investments not measured at fair value or NAV are shown in the following tables:

### Investments Not Measured at Fair Value or NAV

($ thousands)

**Defined Benefit Plan**

| | 2022 | 2021 |
|---|---|---|
| Short-term investments | $878,765 | $1,220,882 |
| Fixed income | — | 8,156 |
| Equity | — | 206 |
| Other investment | — | 2 |
| **Total** | **$878,765** | **$1,229,246** |

### Investments Not Measured at Fair Value or NAV

($ thousands)

**Defined Contribution Plan**

| | 2022 | 2021 |
|---|---|---|
| Short-term investments | $8,658 | $7,958 |
| **Total** | **$8,658** | **$7,958** |

SERS' investment office, in consultation with the board and its investment consultants, updates the SERS Defined Benefit Plan Investment Policy Statement and the Defined Contribution Plan Statement of Investment Policy as necessary.

In June 2018, the board adopted the *SERS 401(a) Defined Contribution Plan Investment Policy Statement*, which was most recently amended on May 5, 2022. The policy defines the purpose of the 401(a) Plan, defines the roles of those responsible for managing the Plan, defines the investment options for the Plan and establishes investment funds performance standards and the objectives, standards and processes for monitoring and evaluating investment options.

In December 2019, the board adopted the *SERS Defined Benefit Plan Investment Policy Statement* and a 10-year asset allocation strategy designed to further mitigate risk, reduce external management fees, and increase fund liquidity. The target asset allocation is used to support the Defined Benefit Plan's long-term return assumption.

The *SERS Defined Benefit Plan Investment Policy Statement* has been amended several times throughout 2021 and 2022.

The following table shows the target asset allocations in place at December 31, 2022 and 2021:

### Target Asset Allocation

| | Long-Term 10-Year Strategic Target | |
|---|---|---|
| **Asset Class** | **2022** | **2021** |
| Private Equity | 16% | 12% |
| Private Credit | 0[1/] | 4 |
| Real Estate | 7 | 7 |
| U.S. Equity | 31 | 31 |
| International Developed Markets Equity | 14 | 14 |
| Emerging Markets Equity | 5 | 5 |
| Fixed Income | 22 | 22 |
| Inflation Protection (TIPS) | 3 | 3 |
| Cash | 2 | 2 |
| **Total** | **100%** | **100%** |

[1/]SERS no longer has an asset allocation targeting this strategy as a stand-alone asset class.

For the years ended December 31, 2022 and 2021, the money weighted rate of return for SERS' Defined Benefit Plan, net of manager fees, was -12.2% and 17.2% respectively. A money weighted rate of return expresses investment performance, net of manager fees, adjusted for the changing amounts actually invested.

In June 2022, with the desire to provide an opportunity to reduce risk while maintaining the potential for achieving a reasonable long-term assumed investment rate of return, the board reduced the actuarial investment return assumption from 7.0% to 6.875%. This change became effective with the December 31, 2022 actuarial valuation. The investment return assumption is reviewed annually and as a part of the normal five-year experience study cycle.

SERS' investments are subject to various risks. Among these risks are concentration of credit risk, custodial credit risk, credit risk, interest rate risk, and foreign currency risk.

Concentration of credit risk is the risk of loss attributed to the magnitude of investment in a single issuer. As of December 31, 2022 and 2021, SERS had no single issuer that exceeded 5% of total investments. Investments issued or explicitly guaranteed by the U.S. government and investments in mutual funds, external investment pools, and other pooled investments were excluded.

Custodial credit risk for investments is the risk that, in the event of the failure of the counterparty to a transaction, SERS would be unable to recover the value of investment or collateral securities that are in the possession of an outside party. Pursuant to the retirement code (71 Pa. C.S. §5931(c)), the State Treasurer serves as custodian of the Defined Benefit Plan. In accordance with a contractual relationship between the commonwealth's Treasury Department and its custodial agent, substantially all investments where securities are used as evidence of the investment, are held by the custodian in book-entry form in SERS' name. Those investments are defined as insured or registered investments for which the securities are held by SERS or its agent and, therefore, have a very minimal level of custodial credit risk losses. All remaining investments do not have securities that are used as evidence of the investments, which are primarily in commingled funds, hedge funds, and limited partnerships, including real estate and private equity.

Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations. The credit risk of a debt instrument is measured by nationally recognized statistical rating agencies such as Moody's Investors Services (Moody's), Standard and Poor's (S&P), and Fitch Ratings (Fitch).

For Defined Benefit Plan fixed income and short-term investment holdings exposed to credit risk, the following tables disclose aggregate fair value, by the least favorable credit rating issued using Moody's, S&P, and Fitch credit ratings at December 31, 2022 and 2021 by debt sector.

## Notes to Basic Financial Statements

December 31, 2022 and 2021

### Debt Securities Exposed to Credit Risk (2022)

($ thousands)

| | AAA | AA | A | BAA | BA and below | NA[1/] | Short-Term Investments[2/] | Total Exposed to Credit Risk[3/] |
|---|---|---|---|---|---|---|---|---|
| Commingled | $— | $— | $— | $— | $— | $1,154,876 | $— | $1,154,876 |
| Corporates | 58,345 | 43,154 | 372,185 | 593,505 | 36,958 | 8,977 | — | 1,113,124 |
| Short-term investments[2/] | — | — | — | — | — | — | 878,765 | 878,765 |
| Asset- and mortgage-backed securities | 250,164 | 13,473 | 5,142 | 3,031 | 23,560 | 1,226 | — | 296,596 |
| Private placements[4/] | 13,569 | — | 5,123 | 84,247 | 84,097 | 84,891 | — | 271,927 |
| Sovereign debt | 16,941 | 48,879 | 18,640 | 34,174 | 1,146 | — | — | 119,780 |
| Agencies | — | 49,108 | — | — | — | — | — | 49,108 |
| Government | 1,749 | 22,655 | 6,009 | 9,199 | — | — | — | 39,612 |
| **Total** | **$340,768** | **$177,269** | **$407,099** | **$724,156** | **$145,761** | **$1,249,970** | **$878,765** | **$3,923,788** |

### Debt Securities Exposed to Credit Risk (2021)

($ thousands)

| | AAA | AA | A | BAA | BA and below | NA[1/] | Short-Term Investments[2/] | Total Exposed to Credit Risk[3/] |
|---|---|---|---|---|---|---|---|---|
| Corporates | $205,969 | $140,039 | $981,089 | $1,720,622 | $62,362 | $5,886 | $— | $3,115,967 |
| Commingled | — | — | — | — | — | 1,656,599 | — | 1,656,599 |
| Short-term investments[2/] | — | — | — | — | — | — | 1,220,882 | 1,220,882 |
| Private placements[4/] | 19,921 | 2,315 | 9,704 | 126,583 | 109,065 | 120,214 | — | 387,802 |
| Sovereign debt | 42,328 | 97,549 | 50,481 | 89,630 | 635 | — | — | 280,623 |
| Asset- and mortgage-backed securities | 100,934 | 24,626 | 6,108 | 5,393 | 26,833 | 1,339 | — | 165,233 |
| Government | 3,412 | 40,704 | 13,786 | 12,583 | — | — | — | 70,485 |
| Agencies | — | 24,010 | — | — | — | — | — | 24,010 |
| **Total** | **$372,564** | **$329,243** | **$1,061,168** | **$1,954,811** | **$198,895** | **$1,784,038** | **$1,220,882** | **$6,921,601** |

[1/]Represents other securities that were either not rated or had a withdrawn rating.

[2/]Represents short-term investments mostly in the commonwealth Treasury Department's STIF, which is not rated. This category comprises short-term, investment grade securities, which are mainly U.S. treasuries, agencies, or repurchase agreements.

[3/]Debt securities exposed to credit risk and U.S. government guaranteed securities, as noted in the subsequent paragraph, comprised short-term investments, commingled fixed income funds, and fixed income from the Statements of Fiduciary Net Position.

[4/]Private placements raise capital via offerings directly to qualified investors rather than through public offerings. Private placements do not have to register with the Securities and Exchange Commission if the securities are purchased for investment as opposed to resale. These private placements have exposure to various fixed income securities.

U.S. government guaranteed securities with a fair value of $3.4 billion and $3.0 billion as of December 31, 2022 and 2021, respectively, are not included in the previous tables because they are not subject to credit risk.

The Defined Contribution Plan is exposed to credit risk through investment in the commonwealth Treasury Department's STIF, which is not rated. The plan had $8.7 million and $8.0 million in STIF as of December 31, 2022 and 2021, respectively. The plan also has indirect exposure to credit risk through the commingled fixed income funds, which had a cumulative balance of $1.5 million and $1.0 million, and the target date funds, which had a balance of $88.5 million and $63.9 million as of December 31, 2022 and 2021, respectively. These funds hold investment grade securities.

Interest rate risk is the risk that interest rate changes will adversely affect the fair value of an investment. As a means for limiting SERS' exposure to fair value losses arising from rising interest rates, SERS' long-term asset allocation policy diversifies its fixed income core segment between intermediate duration and longer duration strategies based on the Bloomberg U.S. Aggregate Bond Index.

Duration is a measure of an investment's sensitivity to changes in interest rates. The higher the duration, the greater the changes in fair value when interest rates change. SERS measures interest rate risk using option adjusted duration, which considers the effect of a security's embedded options on cash flows.

At December 31, 2022 and 2021, SERS' Defined Benefit Plan had the following option-adjusted durations by debt sector:

### Debt Option-Adjusted Durations

($ thousands)

| | 2022 | | 2021 | |
|---|---|---|---|---|
| | Fair Value | Option-Adjusted Duration | Fair Value | Option-Adjusted Duration |
| Sovereign debt | $119,780 | 8.6 | $280,623 | 8.6 |
| Government | 3,408,374 | 7.6 | 3,027,520 | 9.6 |
| Corporates | 1,113,124 | 6.7 | 3,115,967 | 7.1 |
| Asset- and mortgage-backed securities | 296,596 | 6.0 | 165,233 | 3.6 |
| Commingled investment funds | 1,154,876 | 5.7 | 1,656,599 | 3.6 |
| Private placements[1/] | 271,927 | 3.2 | 387,802 | 3.4 |
| Agencies | 49,108 | 3.0 | 24,010 | 3.8 |
| Short-term investments | 878,765 | 0.1 | 1,220,882 | 0.1 |
| **Total[2/]** | **$7,292,550** | | **$9,878,636** | |

[1/]Private placements raise capital via offerings directly to qualified investors rather than through public offerings. Private placements do not have to register with the Securities and Exchange Commission if the securities are purchased for investment as opposed to resale. These private placements have exposure to various fixed income securities.

[2/]Total fair values exposed to interest rate risk comprised short-term investments, commingled fixed income funds, and fixed income from the Statements of Fiduciary Net Position.

**Notes to Basic Financial Statements**
**December 31, 2022 and 2021**

The Defined Contribution Plan is exposed to interest rate risk through investment in the commonwealth Treasury Department's STIF, which had a duration of approximately one month at December 31, 2022 and 2021, respectively. The plan also has indirect exposure to interest rate risk through commingled fixed income funds, which have an average duration of approximately 5.9 years and 6.8 years at December 31, 2022 and 2021, respectively. The cumulative balance of these funds was $1.5 million and $1.0 million as of December 31, 2022 and 2021 respectively.

Foreign currency risk is the risk that fluctuations in exchange rates will adversely affect the fair value of an investment. As part of SERS' program to manage risk and enhance returns, SERS invests in global markets. At December 31, 2022 and 2021, the SERS Defined Benefit Plan had the following currency exposures:

### Foreign Currency Exposures (2022)

($ thousands)

| Currency | Short-Term Investments[1/] | Fixed Income | Common and Preferred Stocks | Other Investments | Real Estate | Private Equity | Total |
|---|---|---|---|---|---|---|---|
| European Euro | $5,844 | $17,881 | $101,685 | $1,869 | $362,346 | $625,880 | $1,115,505 |
| Swedish Krona | — | — | 7,585 | 1,371 | — | 101,822 | 110,778 |
| British Pound Sterling | 582 | 24,997 | 56,730 | (1,833) | — | — | 80,476 |
| Japanese Yen | 205 | — | 39,261 | 3,362 | — | — | 42,828 |
| Swiss Franc | 751 | — | 41,322 | 81 | — | — | 42,154 |
| Canadian Dollar | 30 | — | 31,712 | 1,831 | — | — | 33,573 |
| Danish Krone | 506 | — | 30,162 | 155 | — | — | 30,823 |
| Hong Kong Dollar | 48 | — | 25,755 | — | — | — | 25,803 |
| Australian Dollar | 140 | — | 19,269 | 3,300 | — | — | 22,709 |
| New Taiwan Dollar | 58 | — | 22,131 | — | — | — | 22,189 |
| South Korean Won | 540 | — | 18,325 | — | — | — | 18,865 |
| Mexican Peso | 2 | — | 12,025 | — | — | — | 12,027 |
| Turkish Lira | — | — | 7,931 | — | — | — | 7,931 |
| Indonesian Rupiah | 122 | — | 7,765 | — | — | — | 7,887 |
| Thai Baht | — | — | 7,148 | — | — | — | 7,148 |
| South African Rand | 175 | 1,146 | 7,918 | (2,296) | — | — | 6,943 |
| Norwegian Krone | 52 | — | 4,885 | — | — | — | 4,937 |
| Hungarian Forint | — | — | 1,371 | — | — | — | 1,371 |
| Philippine Peso | — | — | 1,244 | — | — | — | 1,244 |
| Israeli Shekel | — | — | 1,015 | — | — | — | 1,015 |
| Polish Zloty | 106 | — | 868 | — | — | — | 974 |
| Brazilian Real | 530 | — | — | — | — | — | 530 |
| Other currencies (4) | 113 | 1,091 | 692 | (2,814) | — | — | (918) |
| **Total** | **$9,804** | **$45,115** | **$446,799** | **$5,026** | **$362,346** | **$727,702** | **$1,596,792** |

[1/]Includes investment related receivables and payables as of December 31.

## Foreign Currency Exposures (2021)

($ thousands)

| Currency | Short-Term Investments[1/] | Fixed Income | Common and Preferred Stocks | Other Investments | Real Estate | Private Equity | Total |
|---|---|---|---|---|---|---|---|
| European Euro | $12,388 | $21,452 | $126,595 | ($3,008) | $372,572 | $653,030 | $1,183,029 |
| Swedish Krona | — | — | 5,571 | 778 | — | 131,993 | 138,342 |
| British Pound Sterling | 2,403 | 40,309 | 63,622 | (2,194) | — | — | 104,140 |
| Japanese Yen | 585 | — | 68,486 | 3,601 | — | — | 72,672 |
| Swiss Franc | 1,994 | — | 51,190 | (1,767) | — | — | 51,417 |
| South Korean Won | 732 | — | 32,466 | — | — | — | 33,198 |
| Australian Dollar | 179 | — | 27,452 | 4,021 | — | — | 31,652 |
| Canadian Dollar | 297 | 2,554 | 26,454 | (469) | — | — | 28,836 |
| New Taiwan Dollar | 13 | — | 27,066 | — | — | — | 27,079 |
| Danish Krone | 448 | — | 25,172 | 277 | — | — | 25,897 |
| Hong Kong Dollar | 55 | — | 21,693 | — | — | — | 21,748 |
| Mexican Peso | 9 | 691 | 12,507 | — | — | — | 13,207 |
| Thai Baht | — | — | 10,439 | — | — | — | 10,439 |
| South African Rand | 68 | 636 | 5,163 | — | — | — | 5,867 |
| Turkish Lira | — | — | 5,845 | — | — | — | 5,845 |
| Indonesian Rupiah | — | — | 4,494 | — | — | — | 4,494 |
| Norwegian Krone | 148 | — | 3,657 | — | — | — | 3,805 |
| Polish Zloty | 114 | — | 2,089 | — | — | — | 2,203 |
| Hungarian Forint | — | — | 1,741 | — | — | — | 1,741 |
| Israeli Shekel | — | — | 1,515 | — | — | — | 1,515 |
| Philippine Peso | — | — | 957 | — | — | — | 957 |
| Malaysian Ringgit | — | — | 907 | — | — | — | 907 |
| Other currencies (5) | 158 | 1,192 | 333 | (3,508) | — | — | (1,825) |
| **Total** | **$19,591** | **$66,834** | **$525,414** | **($2,269)** | **$372,572** | **$785,023** | **$1,767,165** |

[1/]Includes investment related receivables and payables as of December 31.

The Defined Benefit Plan and the Defined Contribution Plan have indirect foreign currency exposure through its holdings in commingled public equity funds and commingled fixed income funds.

The Defined Contribution Plan also has indirect foreign currency exposure through its holdings in target date funds.

### (5) Securities Lending

In accordance with a contract between the commonwealth's treasurer and its custodian, the SERS Defined Benefit Plan participates in a securities lending program.

The custodian, acting as lending agent, lends the plan's equity, debt, and money market securities for cash, securities, or letter of credit collateral. Collateral is required at 102% of the fair value of the securities loaned except for the equity securities of non-U.S. corporations, for which collateral of 105% is required. Collateral is marked to market daily. If the collateral falls below guidelines for the fair value of the securities loaned, additional collateral is obtained. Cash collateral is invested by the lending agent in accordance with investment guidelines approved by the board. The lending agent cannot pledge or sell securities collateral unless the borrower defaults.

Accordingly, neither securities collateral received from borrowers nor the related obligation to borrowers are reported on the Statement of Fiduciary Net Position.

As of December 31, 2022 and 2021, the Defined Benefit Plan's credit exposure to individual borrowers was limited because the amounts owed to the borrowers exceeded the amounts the borrowers owed the plan. The treasurer's contract with the lending agent requires the agent to indemnify the plan if the borrowers fail to return the underlying securities and the collateral is inadequate to replace the loaned securities or if the borrowers fail to pay income distributions on the loaned securities.

All loaned securities at December 31, 2022 and 2021, could be terminated on demand by either the lending agent or the borrower. Cash collateral is invested in a short-term collective investment pool, which is accounted for at amortized cost. The duration of the investments in the pool at December 31, 2022 and 2021 was three days. Interest rate risk may be posed by mismatched maturities and could be affected by other program features, such as the lending agent's ability to reallocate loaned securities among all of its lending customers.

As of December 31, 2022 and 2021, for the Defined Benefit Plan, the fair value of loaned securities was $497 million and $665 million, respectively; the fair value of the associated collateral was $513 million and $684 million, of which $190 million and $241 million was cash, respectively. As of December 31, 2022 and 2021, securities collateral of $323 million and $443 million, respectively, was invested in U.S. government guaranteed securities, which are not subject to credit risk.

**(6) Derivative and Structured Financial Instruments and Restricted Assets**

SERS mitigates its legal risk on investment holdings including derivatives by ensuring that legal requirements, including indemnification, sovereign immunity, jurisdiction, etc., are acknowledged and agreed to in the derivatives agreements to which they are subject.

Within narrowly prescribed guidelines, the SERS Defined Benefit Plan and Defined Contribution Plan permit investment managers to directly enter into certain derivative and structured financial instruments primarily to hedge risk and reduce the volatility of its portfolio. Typically, investment managers enter into foreign exchange contracts to make payment for international investments and to hedge currency risk, futures contracts to manage interest rate risk, forward settling mortgage instruments for liquidity as well as to gain mortgage exposure, and swaps to more efficiently gain investment exposure in the equity and credit markets.

SERS indirectly holds derivatives and financial instruments through commingled fund structures in the Defined Benefit Plan and the Defined Contribution Plan. At a fund level, these managers hold foreign exchange contracts, futures contracts, and certain swap contracts. These funds invest in instruments directly and indirectly to gain foreign exchange exposure and to manage interest rate risk by altering the average life of the portfolio. Derivatives are viewed within the context of the fund's total portfolio and are consistent with the funds' overall strategy.

SERS is exposed to counterparty credit risk on some open derivative positions. Counterparty credit risk is the risk that a derivative counterparty may fail to meet its payment obligation under the derivative contract.

SERS invests in mortgage-backed securities (MBS) in the form of specified pools to maximize yields. These securities are sensitive to prepayments of mortgages, which may result from a drop in interest rates. The system also uses MBS forwards, which are forward-settling mortgage instruments that are used for liquidity as well as a low-cost, efficient way to gain mortgage exposure. The MBS forwards are subject to credit risk in the event of nonperformance by counterparties. The fair value of MBS forwards was $249 million and $101 million

as of December 31, 2022 and 2021, respectively. These investments are included in fixed income in the Statement of Fiduciary Net Position.

Foreign exchange contracts are agreements to exchange the currency of one country for the currency of another country at an agreed-upon price and settlement date. The investment manager uses these contracts primarily for its international investments to settle pending trades that occur more than two business days after trade date. The contracts are used by the investment manager for the purpose of eliminating foreign exchange risk. As a matter of policy, the investment managers enter into these contracts at their full discretion to protect currency fluctuations. To reduce the risk of counterparty nonperformance, the investment managers generally enter into these contracts with institutions regarded as meeting high standards of creditworthiness. The unrealized gain/loss on contracts is included in the net position and represents the fair value of the contracts on December 31.

At December 31, 2022 and 2021, the Defined Benefit Plan directly-owned contracts to purchase and sell by foreign currencies are shown in the following tables:

## Foreign Exchange Contracts (2022)

($ thousands)

| Currency | Purchases | Unrealized Gain/(Loss) | Sales | Unrealized Gain/(Loss) |
|---|---|---|---|---|
| Japanese Yen | $4,520 | $337 | $1,158 | ($14) |
| Canadian Dollar | 3,464 | (27) | 1,633 | 2 |
| Australian Dollar | 3,301 | 52 | — | — |
| European Euro | 2,260 | 147 | 391 | (10) |
| Swedish Krona | 1,370 | 25 | — | — |
| Mexican Peso | 713 | 5 | 713 | (7) |
| Danish Krone | 261 | 16 | 106 | (3) |
| Swiss Franc | 81 | — | — | — |
| New Zealand Dollar | — | — | 2,814 | (22) |
| South African Rand | — | — | 2,296 | (62) |
| British Pound Sterling | — | — | 1,833 | (90) |
| **Total** | **$15,970** | **$555** | **$10,944** | **($206)** |

**Foreign Exchange Contracts (2021)**

($ thousands)

| Currency | Purchases | Unrealized Gain/(Loss) | Sales | Unrealized Gain/(Loss) |
|---|---|---|---|---|
| Australian Dollar | $4,031 | $33 | $10 | $— |
| Japanese Yen | 3,601 | (66) | — | — |
| Canadian Dollar | 3,436 | 7 | 3,905 | 1 |
| European Euro | 3,256 | (60) | 6,264 | (4) |
| Norwegian Krone | 1,405 | (50) | 1,405 | (42) |
| Russian Ruble | 1,260 | 2 | 1,260 | (23) |
| Swedish Krona | 778 | (44) | — | — |
| South African Rand | 667 | (2) | 667 | (16) |
| Danish Krone | 277 | (6) | — | — |
| New Zealand Dollar | — | — | 3,508 | (34) |
| British Pound Sterling | — | — | 2,194 | (16) |
| Swiss Franc | — | — | 1,767 | (23) |
| **Total** | **$18,711** | **($186)** | **$20,980** | **($157)** |

Swap agreements provide for periodic payments between parties based on the change in value of underlying assets, indexes, rates, and credit worthiness. SERS' managers use contracts with multiple counterparties as well as collateral posting requirements to manage its counterparty credit risk. Credit default swaps are agreements with counterparties to either purchase or sell credit protection. SERS' managers use credit default swaps to either increase or decrease credit exposure to certain credit markets. Interest rate swaps are over-the-counter contracts that allow counterparties to exchange a fixed rate liability for a floating rate liability or vice versa. SERS' managers use interest rate swaps as a cost-effective way of gaining exposure to certain sectors of the fixed income market. SERS' direct exposure to swap agreements was not significant at December 31, 2022 and 2021.

Futures are standardized contracts traded on an exchange. Contract details include the price and quantity of a specific asset to be transacted by either the buyer or the seller on a set date. Futures are subject to certain risks which include liquidity, interest rate, market, and credit risks. Futures are used by SERS' managers to gain desired exposures or hedge certain risks within the portfolio. SERS' managers do not use futures for the purpose of speculation. SERS' exposure to futures was not significant at December 31, 2022. SERS did not have exposure to futures at December 31, 2021.

## (7) Other Post-Employment Benefits (OPEB) for Employees of SERS

### (a) Plan Description

SERS' employees, working in both the Defined Benefit and Defined Contribution Plans, are eligible to participate in the Retired Employees Health Program (REHP) if they meet certain criteria upon retirement. The REHP is a single employer defined benefit OPEB plan that includes commonwealth agencies and some component units. The REHP is established as a trust equivalent arrangement. The REHP is administered by the Pennsylvania Employees Benefit Trust Fund (PEBTF), which acts as a third-party administrator under an administrative agreement with the commonwealth. The REHP is provided as a part of collective bargaining agreements with most commonwealth labor unions. All policy decisions and types and levels of benefits for the REHP fall under the purview of the commonwealth's Executive Board, and the Secretary of Administration. The REHP does not have a governing board.

Detailed information about the REHP is reported in the commonwealth's Annual Comprehensive Financial Report (ACFR) as a pension (and other employee benefit) trust. The REHP is reported using the economic resources measurement focus and the accrual basis of accounting. The commonwealth's ACFR is an audited financial statement and is available at www.budget.pa.gov.

**(b) Benefits Provided**
Eligible employees who retire from the state and meet one of the following eligibility criteria are eligible to receive REHP benefits:

- 25 or more years of service
- 20 or more years of service and superannuation age –
    - Hired before January 1, 2011: Age 50 for Park Rangers, Capitol Police and certain enforcement officers or 60 for general employees
    - Hired between January 1, 2011 - December 31, 2018: Age 55 for Park Rangers, Capitol Police and certain enforcement officers or 65 for general employees
    - Hired on or after January 1, 2019: Age 55 for Park Rangers, Capitol Police, and certain enforcement officers or 67 for general employees
- Disability retirement – requires five years of service (no service requirement for enforcement officers)

Spouses and dependents are eligible for subsidized postemployment medical coverage while the retiree is alive.

The Patient Protection and Affordable Care Act (PPACA), signed into law on March 23, 2010, increased the dependent child age limit to age 26 and applied to the commonwealth effective January 1, 2011.

**(c) Contributions**
Employer contributions for retiree healthcare benefits are charged as a component of payroll expenditures on a "pay as you go" basis. During 2022 and 2021, SERS funded REHP benefits by paying a set dollar amount per pay period for each active SERS employee. However, during 2021 contributions were temporarily eliminated during the last five months of the fiscal year ended June 30, 2021.

Retiree contributions ranged from 0% to 3% of final average salary, which varies depending on retirement date. In addition to the retiree contributions for those hired on or after August 1, 2003, non-Medicare retirees who elect the Choice PPO plan are required to pay the incremental cost between the Choice PPO plan and the least expensive plan (LEP) in their county of residence through monthly pension deductions (PPO buy-up). Surviving spouses of deceased retirees may continue to participate in the plan if they pay the full cost of the coverage.

**(d) Proportionate Share of OPEB Amounts**
The REHP undergoes an actuarial valuation each year and uses a June 30 measurement date.

At December 31, 2022 and 2021, SERS reported a liability of $25.6 million and $25.4 million, respectively, for its proportionate share of the net OPEB liability. SERS' proportion of the net OPEB liability was based on actual contributions made to the REHP. At June 30, 2022 and 2021, SERS proportion was 0.259% and 0.248% respectively.

For the years ended December 31, 2022 and 2021, SERS recognized an OPEB benefit of $4.4 million and $4.0 million respectively, which is included with administrative expenses.

## Notes to Basic Financial Statements

**December 31, 2022 and 2021**

At December 31, 2022 and 2021, SERS reported deferred outflows of resources and deferred inflows of resources related to OPEB from the following sources:

### Schedule of Deferred Outflows and Inflows

($ thousands)

#### Defined Benefit Plan

| | 2022 | | 2021 | |
|---|---|---|---|---|
| | Deferred Outflows of Resources | Deferred Inflows of Resources | Deferred Outflows of Resources | Deferred Inflows of Resources |
| Changes in assumptions or other inputs as of measurement date | $2,079 | $4,228 | $2,905 | $3,345 |
| Change in proportionate share and differences between actual and proportionate share employer contributions | 1,798 | 280 | 2,500 | 521 |
| Contributions subsequent to measurement date | 322 | — | 284 | — |
| Differences between expected and actual experience in total OPEB liability | 873 | 6,846 | 20 | 11,571 |
| Net differences between projected and actual earnings on plan investments | 95 | — | — | 230 |
| **Total** | **$5,167** | **$11,354** | **$5,709** | **$15,667** |

#### Defined Contribution Plan

| | 2022 | | 2021 | |
|---|---|---|---|---|
| | Deferred Outflows of Resources | Deferred Inflows of Resources | Deferred Outflows of Resources | Deferred Inflows of Resources |
| Changes in assumptions or other inputs as of measurement date | 238 | 485 | 184 | 211 |
| Change in proportionate share and differences between actual and proportionate share employer contributions | 2,829 | — | 1,800 | — |
| Contributions subsequent to measurement date | 24 | — | 19 | — |
| Differences between expected and actual experience in total OPEB liability | 100 | 785 | 1 | 731 |
| Net differences between projected and actual earnings on plan investments | 11 | — | — | 15 |
| **Total** | **$3,202** | **$1,270** | **$2,004** | **$957** |

**(e) Actuarial Assumptions**
The total OPEB liability was determined by an actuarial valuation as of June 30, 2022 and 2021. The following actuarial assumptions were used:

- Investment rate of return: 6.75% in 2022 and 2021
- Inflation: 2.50% in 2022 and 2021
- Projected salary increases: average career salary growth of 2.80% in 2022 and 2021 and general salary schedule increases of 2.80% in 2022 and 2021.
- Healthcare cost trend rates: 7.30% for 2022 and 6.90% for 2021, both decreasing to an ultimate rate of 3.90% in 2022 and 4.00% in 2021.
- Mortality rate for healthy participants: projected PubG-2010 Mortality Tables, with rates set forward one year for females, and adjusted for mortality improvements using projection scale MP-2021 for 2022 and MP-2020 for 2021.
- Mortality rate for disabled participants: projected Pub-2010 Non-Safety Disabled Retiree Headcount Weighted Mortality Tables, with rates set forward two years for males and females, and adjusted for mortality improvements using projection scale MP-2021 for 2022 and MP-2020 for 2021.

Certain applicable assumptions mentioned above are based on SERS' Defined Benefit Plan experience study covering the periods 2015 - 2019, which was released in July 2020.

The assets of the REHP are managed by the commonwealth's Treasury Department in an investment pool. The REHP investments are made based upon an interagency agreement, dated June 17, 2008, and the prudent expert standard set forth in the commonwealth's fiscal code 72 P.S.§30.1, amendment to the fiscal code, the principles of Prudent Expert Standards.

The long-term expected rate of return on REHP plan investments is determined using a risk premium review. This review compares the current relationship between fixed income and equity and their relationship over long periods of time to come up with an expected rate of return. Other variables considered in the expected rates of return are a reversion to the mean for each asset class. Best estimates of arithmetic real rates of return for each major asset class included in the target asset allocation are summarized in the following table:

**Long-Term Expected Real Rate of Return**

| | 2022 | | 2021 | |
|---|---|---|---|---|
| **Asset Class** | **Target Allocation** | **Long-Term Expected Real Rate of Return** | **Target Allocation** | **Long-Term Expected Real Rate of Return** |
| Domestic equity | 40% | 5.1% | 40% | 5.8% |
| International equity | 27 | 5.5 | 27 | 6.3 |
| Fixed income | 23 | 1.6 | 23 | 2.1 |
| Real estate | 8 | 4.7 | 8 | 5.1 |
| Cash and cash equivalents | 1.5 | — | 1.5 | 0.4 |
| Private equity | 0.5 | 8.3 | 0.5 | 9.3 |
| **Total** | **100%** | | **100%** | |

Since REHP has insufficient assets to meet next year's projected benefit payments, the discount rate was based on a combination of the long-term expected rate of return of 6.75% on assets held in the OPEB investment pool and a municipal bond rate of 3.54% for 2022 and 2.16% for 2021, based on the Bond Buyer 20-Bond General Obligation Index. The resulting discount rates were 4.67% and 3.63% as of June 30, 2022 and June 30, 2021, respectively.

**(f) Sensitivity Analysis**
Sensitivity of SERS' proportionate share of the net OPEB liability to changes in the discount rate and healthcare cost trend rates of 1% lower or higher is not significant. More detail regarding this at the REHP plan level can be found in the commonwealth's ACFR, which is an audited financial statement and is available at www.budget.pa.gov.

**(g) Required Supplementary Information (RSI) for OPEB**
The schedules of SERS' proportionate share of the net OPEB liability and SERS' contributions are not significant so the related RSI is not included within these financial statements. More detail regarding this at the REHP plan level can be found in the commonwealth's ACFR, which is an audited financial statement and is available at www.budget.pa.gov.

### (8) Litigation and Contingencies
SERS is involved in various individual lawsuits, generally related to benefit payments, which, in the event of an adverse result, could increase estimated actuarial liabilities by approximately $1 billion. Some of the cases involve legal issues that, if extended to the entire membership, may result in significant costs to SERS. If such an event were to occur, the additional costs would be recovered by SERS through adjustments to the employer contribution rate. SERS makes every effort to defend its position in these proceedings.

### (9) Net Pension Liability
The components of the net pension liability of participating employers at December 31, 2022 and 2021, were as follows:

**Net Pension Liability**
($ thousands)

| | 2022 | 2021 |
|---|---|---|
| Total pension liability | $54,622,092 | $52,936,505 |
| Plan fiduciary net position | 33,607,207 | 40,231,015 |
| **Net pension liability** | **$21,014,885** | **$12,705,490** |
| Plan fiduciary net position as a percentage of the total pension liability | 61.5% | 76.0% |

The total pension liability was determined by an actuarial valuation for financial reporting purposes as of December 31, 2022 and 2021, using some of the following actuarial methods and assumptions:

- Actuarial cost method: entry age
- Investment rate of return (discount rate): 6.875% including inflation for 2022 and 7.0% including inflation for 2021
- Projected salary increases: average of 4.55% and 4.6% for 2022 and 2021, respectively, with a range of 3.30% to 6.95% including inflation for both years.
- Asset valuation method: fair (market) value
- Inflation: 2.50%
- Mortality rate: projected PubG-2010 and PubNS-2010 Mortality Tables adjusted for actual plan experience and future improvement for retirees, beneficiaries, and survivors and rates determined by SERS' actuaries using actual SERS experience for pre-retirement active members

The assumptions mentioned above, unless otherwise approved by the board, are based on the 19th Investigation of Actuarial Experience study covering the periods 2015 - 2019, which was released in July 2020.

The long-term expected real rate of return on pension plan investments is determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation.

Best estimates of geometric real rates of return for each major asset class included in the pension plan's target asset allocation in note 4 as of December 31, 2022 and 2021 (see the discussion of the pension plan's investment policy) are summarized in the following table:

### Long-Term Expected Real Rate of Return

| Asset Class | 2022 | 2021 |
|---|---|---|
| Private Equity | 5.75% | 6.00% |
| Private Credit | 0.00[1/] | 4.25 |
| Real Estate | 5.12 | 3.75 |
| U.S. Equity | 4.35 | 4.60 |
| International Developed Markets Equity | 4.25 | 4.50 |
| Emerging Markets Equity | 4.65 | 4.90 |
| Fixed Income | (0.50) | (0.25) |
| Inflation Protection (TIPS) | (1.00) | (0.30) |
| Cash | (1.05) | (1.00) |

[1/]SERS no longer has an asset allocation targeting this strategy as a stand-alone asset class.

The projection of cash flows used to determine the discount rate assumed that contributions from plan members will be made at the current contribution rates and that contributions from participating employers will be made at actuarially determined rates as set by statute. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

The following presents the net pension liability calculated using the discount rate of 6.875% for 2022 and 7.0% for 2021, as well as what the net pension liability would be if it were calculated using a discount rate that is one percentage point lower or one percentage point higher than the current rate:

### Sensitivity of the Net Pension Liability to Change in the Discount Rate (2022)

($ thousands)

| | 1% Decrease to 5.875% | Current Discount Rate of 6.875% | 1% Increase to 7.875% |
|---|---|---|---|
| Net pension liability | $26,937,912 | $21,014,885 | $16,012,481 |

### Sensitivity of the Net Pension Liability to Change in the Discount Rate (2021)

($ thousands)

| | 1% Decrease to 6.0% | Current Discount Rate of 7.0% | 1% Increase to 8.0% |
|---|---|---|---|
| Net pension liability | $18,402,457 | $12,705,490 | $7,888,887 |

## Required Supplementary Information

December 31, 2022 (unaudited)

### Schedule 1: Schedule of Changes in Net Pension Liability and Related Ratios

($ millions)

| | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total pension liability** | | | | | | | | | | |
| Service cost | $901 | $924 | $1,003 | $982 | $965 | $961 | $953 | $955 | $944 | $943 |
| Interest | 3,635 | 3,594 | 3,458 | 3,409 | 3,334 | 3,262 | 3,271 | 3,123 | 3,042 | 2,975 |
| Differences between expected and actual experience | 363 | (105) | 35 | 66 | 167 | 130 | (534) | 378 | 98 | (143) |
| Changes of assumptions | 672 | — | 2,041 | 562 | — | — | 947 | 669 | — | — |
| Benefit payments, including refunds of member contributions | (3,885) | (3,731) | (3,557) | (3,513) | (3,395) | (3,304) | (3,228) | (3,081) | (2,946) | (2,844) |
| Net change in total pension liability | 1,686 | 682 | 2,980 | 1,506 | 1,071 | 1,049 | 1,409 | 2,044 | 1,138 | 931 |
| Total pension liability - beginning | 52,936 | 52,254 | 49,274 | 47,768 | 46,697 | 45,648 | 44,239 | 42,195 | 41,057 | 40,126 |
| **Total pension liability - ending (a)** | **$54,622** | **$52,936** | **$52,254** | **$49,274** | **$47,768** | **$46,697** | **$45,648** | **$44,239** | **$42,195** | **$41,057** |
| **Plan fiduciary net position** | | | | | | | | | | |
| Contributions - employer[1/] | $2,075 | $2,871 | $3,186 | $2,115 | $2,049 | $1,898 | $1,622 | $1,360 | $1,084 | $795 |
| Contributions - member | 419 | 405 | 410 | 405 | 394 | 383 | 375 | 372 | 366 | 352 |
| Net investment income/(loss) | (5,213) | 5,682 | 3,920 | 5,175 | (1,442) | 4,066 | 1,587 | 88 | 1,462 | 3,724 |
| Benefit payments, including refunds of member contributions | (3,885) | (3,731) | (3,557) | (3,513) | (3,395) | (3,304) | (3,228) | (3,081) | (2,946) | (2,844) |
| Administrative expense | (19) | (24) | (27) | (23) | (26) | (26) | (23) | (22) | (22) | (22) |
| Net change in plan fiduciary net position | (6,623) | 5,203 | 3,932 | 4,159 | (2,420) | 3,017 | 333 | (1,283) | (56) | 2,005 |
| Plan fiduciary net position - beginning | 40,231 | 35,028 | 31,096 | 26,937 | 29,405 | 26,388 | 26,055 | 27,338 | 27,394 | 25,389 |
| Cumulative effect of change in accounting principle | NA | NA | NA | NA | (48) | NA | NA | NA | NA | NA |
| Beginning balance restated | NA | NA | NA | NA | 29,357 | NA | NA | NA | NA | NA |
| Plan fiduciary net position - ending (b) | 33,607 | 40,231 | 35,028 | 31,096 | 26,937 | 29,405 | 26,388 | 26,055 | 27,338 | 27,394 |
| **Net pension liability - ending (a) - (b)** | **$21,015** | **$12,705** | **$17,226** | **$18,178** | **$20,831** | **$17,292** | **$19,260** | **$18,184** | **$14,857** | **$13,663** |
| Plan fiduciary net position as a percentage of the total pension liability | 61.5% | 76.0% | 67.0% | 63.1% | 56.4% | 63.0% | 57.8% | 58.9% | 64.8% | 66.7% |
| Covered payroll | $6,548 | $6,384 | $6,442 | $6,329 | $6,179 | $5,984 | $5,912 | $5,972 | $5,720 | $5,598 |
| Net pension liability as percentage of covered payroll | 321.0% | 199.0% | 267.4% | 287.2% | 337.1% | 288.9% | 325.8% | 304.5% | 259.7% | 244.1% |

[1/] Contributions - employer includes the $825 million one-time lump sum payment received from the Pennsylvania State System of Higher Education (PASSHE) in 2021, and $1.06 billion from Penn State University in 2020. See note 1 for more information.

See accompanying independent auditors' report.

## Schedule 2: Schedule of Employer Contributions

($ millions)

| Year[1/] | Actuarially Determined Contribution (ADC) | Contributions in Relation to the ADC | Contribution Deficiency (Excess) | Covered Payroll | Contributions as a Percentage of Covered Payroll |
|---|---|---|---|---|---|
| 2022[2/] | $2,066 | $2,066 | $— | $6,548 | 31.55% |
| 2021[2/] | 2,079 | 2,858[4/] | (779) | 6,384 | 44.77 |
| 2020[2/] | 2,164 | 3,175[5/] | (1,011) | 6,442 | 49.29 |
| 2019[2/] | 2,106 | 2,106 | — | 6,329 | 33.28 |
| 2018[2/] | 2,040 | 2,040 | — | 6,179 | 33.02 |
| 2017[2/,3/] | 1,884 | 1,884 | — | 5,984 | 31.47 |
| 2016[3/] | 1,614 | 1,614 | — | 5,912 | 27.30 |
| 2015[3/] | 1,360 | 1,360 | — | 5,972 | 22.78 |
| 2014[3/] | 1,084 | 1,084 | — | 5,720 | 18.95 |
| 2013[3/] | 795 | 795 | — | 5,598 | 14.20 |

[1/]The rates used in developing the ADC in the above schedule of contributions are calculated as of December 31, two years prior to the first half, January 1 – June 30, of the year in which contributions are reported and one year prior to the second half, July 1 – December 31, of the year in which contributions are reported. The following funding valuation actuarial methods and assumptions were used to determine contribution rates reported in this schedule as of the December 31 annual funding valuations:

- Actuarial cost method: variation of entry-age cost method for valuation years 2013 - 2020 and traditional entry-age for valuation years 2021 - 2022
- Asset valuation method: five-year smoothing (all years)
- Inflation: 2.75% for valuation years 2013 - 2015, 2.6% for valuation years 2016 - 2019, and 2.5% for valuation years 2020 - 2022
- Projected average salary increases: 6.1% for valuation years 2013 - 2014, 5.7% for valuation year 2015, 5.6% for valuation years 2016 - 2019, 4.6% for valuation years 2020 - 2021, and 4.55% for valuation year 2022
- Assumed investment rate of return (net of manager fees including inflation): 7.5% for valuation years 2013 - 2015, 7.25% for valuation years 2016 - 2018, 7.125% for valuation year 2019, 7.0% for valuation years 2020 - 2021, and 6.875% for valuation year 2022

[2/]ADC excludes multiple service transfers made to SERS. These transfers are included as contributions on the Statements of Changes in Fiduciary Net Position.

[3/]The ADC disclosed above is based on minimum floor rates or suppressed rates resulting from collars that were required based on statutory law. These rates were determined by SERS actuary during the annual funding valuation and include an adjustment to the "preliminary employer contribution rate" calculated before the minimum floor or collars were applied. These "final employer contribution rates" fell within the realm of an appropriate ADC calculation under actuarial standards of practice and temporarily deferred a portion of the payments that work towards fully funding the plan.

[4/]Contributions include the $825 million one-time lump sum payment received from the Pennsylvania State System of Higher Education (PASSHE), less credits utilized during the year. See note 1 for more information.

[5/]Contributions include the $1.06 billion one-time lump sum payment received from Penn State University, less credits utilized during the year. See note 1 for more information.

## Schedule 3: Schedule of Investment Returns

| | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| Annual money-weighted rate of return, net of investment expense | -12.2% | 17.2% | 11.3% | 18.8% | -4.5% | 15.1% | 6.4% | 0.4% | 6.4% | 13.6% |

See accompanying independent auditors' report.

## Supplementary Information

Year Ended December 31, 2022

### Schedule 4: Schedule of Administrative Expenses

($ thousands)

| | Defined Benefit Plan | Defined Contribution Plan | Total |
|---|---|---|---|
| Personnel services | | | |
| Salaries | $8,971 | $1,454 | $10,425 |
| Benefits | 6,262 | 971 | 7,233 |
| Temporary personnel wages and overtime | 407 | 47 | 454 |
| **Total personnel services** | **15,640** | **2,472** | **18,112** |
| Operational | | | |
| Travel | 30 | — | 30 |
| Training | 104 | — | 104 |
| Communication services | 427 | 37 | 464 |
| Consultants | 599 | 97 | 696 |
| Legal services/fees | 7 | — | 7 |
| Specialized services | 602 | 1,253 | 1,855 |
| Advertising | 8 | — | 8 |
| IT consulting | (553) | 209 | (344) |
| Contracted maintenance non-IT | 24 | — | 24 |
| Hardware/software and maintenance | 1,718 | 107 | 1,825 |
| Real estate | 1,740 | 156 | 1,896 |
| Vehicles | 28 | — | 28 |
| Office equipment | 260 | — | 260 |
| Other rentals/leases | 2 | — | 2 |
| Office supplies | 45 | 2 | 47 |
| Motorized equipment maintenance | 3 | — | 3 |
| Postage | 660 | 17 | 677 |
| Freight | 3 | — | 3 |
| Printing | 113 | 1 | 114 |
| Subscriptions and licensing | 79 | — | 79 |
| Membership dues | 13 | 1 | 14 |
| Conference | 5 | — | 5 |
| Insurance, surety, and fidelity bonds | 4 | — | 4 |
| Treasury services | 886 | — | 886 |
| Other operational | 1,258 | 12 | 1,270 |
| **Total operational** | **8,065** | **1,892** | **9,957** |
| Total administrative expenses before OPEB | 23,705 | 4,364 | 28,069 |
| (OPEB benefit)/OPEB expense | (4,679) | 237 | (4,442) |
| **Total administrative expenses** | **$19,026** | **$4,601** | **$23,627** |

See accompanying independent auditors' report.

## Schedule 5: Summary of Investment and Consultant Expenses

($ thousands)

### Investment Expenses

| Expense Category | Expenses |
|---|---|
| Defined Benefit Plan manager investment expenses | |
| Private Equity | $79,446 |
| Real Estate | 30,701 |
| U.S. Equity | 2,745 |
| International Developed Markets Equity | 6,177 |
| Emerging Markets Equity | 6,875 |
| Fixed Income | 9,238 |
| Inflation Protection (TIPS) | 1,116 |
| Legacy Private Credit | 11,397 |
| Legacy Hedge Funds | 2 |
| **Total Defined Benefit Plan manager investment expenses** | **147,697** |
| Investment professional personnel | 4,655 |
| Investment consultants | 3,309 |
| Custodian | 995 |
| Subscriptions and memberships | 540 |
| Operational | 149 |
| **Total Defined Benefit Plan investment expenses** | **157,345** |
| Defined Contribution Plan investment expenses | 50 |
| **Total investment expenses** | **$157,395** |

### Consultant Expenses

| Firm | Service Type | Expenses |
|---|---|---|
| Defined Benefit Plan investment consultant expenses | | |
| StepStone Group | Private equity investments | $1,975 |
| NEPC | Real estate investments | 535 |
| Callan | General investments | 415 |
| Fairview Capital Partners | Investment portfolio management | 272 |
| Other | Other | 112 |
| **Total Defined Benefit Plan investment consultant expenses** | | **3,309** |
| Defined Benefit Plan administrative consultant expenses | | |
| Korn Ferry Hay Group | Actuary | 480 |
| Other | Multiple | 119 |
| **Total Defined Benefit Plan administrative consultant expenses** | | **599** |
| Defined Contribution Plan consultant expenses | Multiple | 97 |
| **Total consultant expenses** | | **$4,005** |

See accompanying independent auditors' report.

# Investment Section

pennsylvania
STATE EMPLOYEES' RETIREMENT SYSTEM
100 YEARS OF SERVICE
MAKING A DIFFERENCE - THEN. NOW. TOMORROW.

pennsylvania
STATE EMPLOYEES' RETIREMENT SYSTEM
100 YEARS OF SERVICE
MAKING A DIFFERENCE - THEN. NOW. TOMORROW.

May 28, 2023

State Employees' Retirement Board and Executive Director
State Employees' Retirement System
30 North Third Street, Suite 150
Harrisburg, Pennsylvania 17101

On behalf of the Pennsylvania State Employees' Retirement System's (SERS) Investment Office, I am pleased to present the investment section of SERS Annual Comprehensive Financial Report for calendar year 2022. The SERS Board administers a Defined Benefit Plan with approximately $33.6 billion in net position, a Defined Contribution Plan with approximately $105.8 million in net position, and a voluntary Deferred Compensation Plan offered to members with approximately $4.0 billion in net position.

SERS' Defined Benefit Plan investment performance for the calendar year ended December 31, 2022, was -12.2% (net of fees). This compares to a 2021 calendar year return of 17.2% (net of fees). The end of 2022 marks 3-, 5-, 10-, 15-, 20-, and 25-year periods of returns of 4.6%, 5.3%, 6.8%, 4.5%, 7.6%, and 6.7% (net of fees), respectively. Performance is calculated using a Modified Dietz return methodology.

SERS' funded status as a percentage of the total pension liability was approximately 68.0% (actuarial value), as of December 31, 2022. SERS' Board considers its funded status in selecting its risk tolerance, and as such prioritizes an asset allocation to meet the long-term actuarial assumed rate of return, while also addressing shorter-term liquidity needs to pay benefits.

A number of key accomplishments were achieved in 2022 pertaining primarily to the defined benefit plan, several of which are documented below:

- Maintained low annual investment manager fees and expenses paid to external firms of approximately 41.2 basis points or 0.41% of total plan assets

- Recommended and implemented the Enhanced Asset Allocation Policy to increase projected returns and further minimize complexity in both the Private Equity and Real Estate asset classes

- Restructured fixed income portfolios to comply with the Enhanced Asset Allocation Policy

- Enhanced the Investment Office bench strength by hiring an additional portfolio manager and senior investment analyst with experience in private market diligence and compliance, as well as three new investment analysts

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- Committed $1.0 billion to eight best-in-class private market managers
    - Of which, $175.0 million was allocated to four no-fee/no-carry private equity co-investment vehicles
    - $99.5 million was allocated to SERS' current co-investment program to further enhance returns and reduce private equity fees
- Provided education on the Fixed Income asset class to communicate the benefits of active core and core plus strategies
    - As a result, a core and core plus Fixed Income manager search was launched

The investment section of this report provides further information regarding the investment program. The Investment Office continues to operate efficiently and effectively. I remain confident that with a focus on the SERS mission, thoughtful leadership from the Board, and a disciplined investment process aligned with the investment objectives, SERS and its members will continue on the path of financial security.

Sincerely,

J. G. Nolan

James G. Nolan
Chief Investment Officer

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## Investment Policy

The SERS Board originally adopted a formal *Statement of Investment Policy* in 1979. It has been revised periodically to reflect and incorporate legislative changes governing investments and amendments to policies and procedures guiding the investment of the defined benefit portfolio. On May 5, 2022, the SERS Board adopted the amended *SERS' Defined Benefit Plan Investment Policy Statement* (IPS).

The purpose of the IPS is to formalize the board's investment objectives and policies, and to define the duties and responsibilities of the various individuals and entities involved in the investment process.

The major elements of the IPS are:

- The assets of the SERS Fund will be managed with the primary objectives of the payment of benefit obligations to participants in the plans as well as to maximize return with acceptable risk considerations and sufficient liquidity so that employer contributions can be minimized.

- The SERS Fund's overall investment objective is to provide a total rate of return, over full economic cycles, which achieves SERS' long-term actuarially assumed rate of return consistent with the board's tolerance for risk.

- The board's investment authority is governed by the prudent expert standard as set forth in Title 71, Pennsylvania Consolidated Statutes, Section 5931(a).

- The members of the board, employees of SERS, and agents thereof shall stand in a fiduciary relationship to the members of the system regarding the investments and disbursements of any of the moneys of the fund and shall not profit either directly or indirectly with respect thereto.

- The board employs an investment staff which is responsible to the board to review and analyze the current investment climate, and to recommend adjustments with respect to the policy that are appropriate to take optimum advantage of new conditions and strategies as they arise in the market place. The staff also reviews and analyzes the philosophies, policies, and strategies employed by the investment managers, evaluating the appropriateness of their decision-making processes and their investment styles in relation to present and projected investment horizons.

- The board continually seeks to employ investment managers that possess superior capabilities in the management of assets of public retirement systems. Each manager has full discretion to carry out its investment mandate subject to the investment strategy statement contained in the investment management agreement and will be expected to conduct business on behalf of SERS in accordance with the mandate for which they were retained.

- SERS will employ investment consultants, who act as fiduciaries to the fund, and who will provide investment consulting services in their respective areas of expertise.

- Where investment characteristics are equivalent, the policy will favor investments that will have a positive impact on the economy of the Commonwealth of Pennsylvania.

- A 10-year asset allocation strategy is designed to increase the expected return, maintain exposure to less liquid non-traditional strategies, and continue the plan's commitment to liquidity through the allocation to capital preservation assets.

## Investment Policy and Objectives

December 31, 2022 (unaudited)

### Investment Objectives

As indicated in SERS' IPS, the objectives of the SERS Fund are to provide benefit payments to participants and beneficiaries at the lowest cost to the commonwealth and to fund the program through a carefully planned and executed investment program.

Consistent with achieving these objectives, the board has established the following goals relative to investment performance:

- Achieve SERS' target rate of return over the long-term, net of fees.
- Achieve SERS' total fund policy benchmark return over 10-year periods, net of fees. The fund policy benchmark index will be based on the asset allocation set forth in the IPS approved by the board.

SERS' investment process requires a thorough analysis of the plan liabilities, liquidity requirements, and market opportunities. The board, in collaboration with the Chief Investment Officer, actuarial consultant, and general investment consultant, establishes a target rate of return. Achieving, or exceeding this target rate of return is the primary investment performance objective of SERS' Investment Office to help meet the desired funded status.

## Investment Returns

December 31, 2022 (unaudited)

### Calendar Year, Net-of-Fees Returns[1/]

For the period ending December 31, 2022

| Asset Class | 1-Year Total Return | 3-Year Total Return | 5-Year Total Return | 10-Year Total Return |
|---|---|---|---|---|
| Private Equity[2/,5/] | -5.1% | 19.8% | 16.1% | 13.2% |
| *Burgiss All Private Equity Custom Index[3/,5/]* | *-1.8* | *15.4* | *14.0* | *13.5* |
| *Global Equity +3%[4/,5/]* | *-15.5* | *9.4* | *11.0* | *14.1* |
| Real Estate[5/] | 6.0 | 8.5 | 6.7 | 7.3 |
| *Real Estate Custom Benchmark[5/,6/]* | *17.4* | *11.4* | *9.2* | *9.8* |
| *Consumer Price Index +3%[5/]* | *11.2* | *8.0* | *6.8* | *5.5* |
| U.S. Equity | -19.1 | 7.0 | 8.1 | 11.4 |
| *Russell 3000 Index* | *-19.2* | *7.1* | *8.8* | *12.1* |
| *S&P 1500 Index* | *-17.8* | *7.6* | *9.2* | *12.4* |
| International Developed Markets Equity | -15.2 | 2.1 | 2.4 | 5.5 |
| *MSCI World ex U.S. IMI* | *-15.3* | *1.1* | *1.6* | *4.7* |
| Emerging Markets Equity | -22.8 | -1.5 | -0.5 | 2.2 |
| *MSCI Emerging Markets IMI* | *-19.8* | *-1.8* | *-1.1* | *1.6* |
| Fixed Income | -12.3 | -2.7 | 0.0 | 1.2 |
| *Bloomberg U.S. Aggregate Bond Index* | *-13.0* | *-2.7* | *0.0* | *1.1* |
| Inflation Protection (TIPS) | -13.0 | 0.5 | 1.6 | 1.0 |
| *Bloomberg U.S. TIPS Index* | *-11.9* | *1.2* | *2.1* | *1.1* |
| Cash | 1.7 | 0.8 | 1.4 | 1.0 |
| *ICE BofAML U.S. 3-Month Treasury Bill Index* | *1.5* | *0.7* | *1.3* | *0.8* |
| *Legacy Private Credit[5/,8/]* | *8.0* | *10.6* | *NA* | *NA* |
| *S&P/LSTA Leveraged Loan Index +1%[5/]* | *-1.5* | *3.3* | *NA* | *NA* |
| **Total Fund[7/]** | **-12.2%** | **4.6%** | **5.3%** | **6.8%** |
| ***Total Fund Custom Benchmark*** | ***-11.8%*** | ***5.6%*** | ***6.1%*** | ***7.6%*** |
| ***Total Fund Custom Public Market Equivalent Benchmark*** | ***-13.7%*** | ***3.6%*** | ***5.0%*** | ***7.2%*** |
| ***Total Fund 60/40 Index*** | ***-16.0%*** | ***1.6%*** | ***3.3%*** | ***5.4%*** |

1/Returns for periods greater than one year are annualized. Performance was calculated using the Modified Dietz day-weighted return methodology.

2/Historical Private Equity performance includes Buyouts, Special Situations, and Growth Equity.

3/Intended to compare the program's performance to its peers.

4/Long-term benchmark by which SERS measures its private market performance. Shorter term variances (1-year and 3-year) can be pronounced due to the nature of private assets and are not as relevant for benchmark purposes.

5/Private Equity, Legacy Private Credit, Real Estate and the corresponding benchmarks are reported on a quarter-lagged basis.

6/Calculated monthly using beginning of the month asset class weights applied to each corresponding primary benchmark return. The real estate custom benchmark is 100% NCREIF NFI-ODCE (1 Qtr lag).

7/Legacy Hedge Funds are in liquidation, values and performance are no longer reported. However, all performance activity continues to be reflected in SERS' Total Fund return.

8/Legacy Private Credit performance is included in the total fund starting at the composite's true inception date, July 1, 2022. The history is calculated and shown for informational purposes.

## Investment Returns

**December 31, 2022 (unaudited)**

### Fiscal Year, Net-of-Fees Returns[1/]

For the period ending June 30, 2022

| Asset Class | 1-Year Total Return | 3-Year Total Return | 5-Year Total Return | 10-Year Total Return |
|---|---|---|---|---|
| Private Equity[2/,5/] | 22.8% | 23.6% | 19.2% | 14.1% |
| *Burgiss All Private Equity Custom Index[3/,5/]* | *17.2* | *19.1* | *17.1* | *14.5* |
| *Global Equity +3%[4/,5/]* | *13.0* | *19.8* | *17.7* | *17.0* |
| Private Credit[5/,8/] | 12.7 | 12.5 | NA | NA |
| *S&P/LSTA Leveraged Loan Index +1%[5/]* | *4.3* | *5.3* | *NA* | *NA* |
| Real Estate[5/] | 17.3 | 10.0 | 7.0 | 7.7 |
| *Real Estate Custom Benchmark[5/,6/]* | *24.9* | *10.5* | *8.8* | *9.8* |
| *Consumer Price Index +3%[5/]* | *11.5* | *7.2* | *6.4* | *5.3* |
| U.S. Equity | -14.5 | 9.3 | 9.8 | 11.9 |
| *Russell 3000 Index* | *-13.9* | *9.8* | *10.6* | *12.6* |
| *S&P 1500 Index* | *-11.0* | *10.3* | *10.9* | *12.8* |
| International Developed Markets Equity | -17.0 | 2.7 | 3.1 | 6.3 |
| *MSCI World ex U.S. IMI* | *-17.7* | *1.7* | *2.6* | *5.5* |
| Emerging Markets Equity | -28.6 | 1.9 | 2.9 | 3.7 |
| *MSCI Emerging Markets IMI* | *-24.8* | *1.2* | *2.3* | *3.2* |
| Fixed Income | -9.4 | -1.0 | 0.9 | 2.0 |
| *Bloomberg U.S. Aggregate Bond Index* | *-10.3* | *-0.9* | *0.9* | *1.5* |
| Inflation Protection (TIPS) | -6.5 | 2.4 | 2.8 | 1.6 |
| *Bloomberg U.S. TIPS Index* | *-5.1* | *3.0* | *3.2* | *1.7* |
| Cash | 0.2 | 0.7 | 1.2 | 0.9 |
| *ICE BofAML U.S. 3-Month Treasury Bill Index* | *0.2* | *0.6* | *1.1* | *0.6* |
| **Total Fund[7/]** | **-5.7%** | **6.8%** | **7.0%** | **7.4%** |
| ***Total Fund Custom Benchmark*** | ***-5.7%*** | ***7.5%*** | ***7.5%*** | ***8.1%*** |
| ***Total Fund Custom Public Market Equivalent Benchmark*** | ***-8.0%*** | ***6.4%*** | ***6.9%*** | ***8.0%*** |
| ***Total Fund 60/40 Index*** | ***-13.9%*** | ***3.5%*** | ***4.7%*** | ***6.0%*** |

[1/]Returns for periods greater than one year are annualized. Performance was calculated using the Modified Dietz day-weighted return methodology.

[2/]Historical Private Equity performance includes Buyouts, Special Situations, and Growth Equity.

[3/]Intended to compare the program's performance to its peers.

[4/]Long-term benchmark by which SERS measures its private market performance. Shorter term variances (1-year and 3-year) can be pronounced due to the nature of private assets and are not as relevant for benchmark purposes.

[5/]Private Equity, Private Credit, Real Estate and the corresponding benchmarks are reported on a quarter-lagged basis.

[6/]Calculated monthly using beginning of the month asset class weights applied to each corresponding primary benchmark return. The real estate custom benchmark consists of 90% NCREIF ODCE Index (1 Qtr lag) and 10% FTSE NAREIT Index (unlagged).

[7/]Legacy Hedge Funds are in liquidation, values and performance are no longer reported. However, all performance activity continues to be reflected in SERS' Total Fund return.

[8/]Private Credit has an inception date of December 1, 2017. As of June 30, 2022, extended period returns beyond three years are unavailable.

## Pension Fund Values and Annual Returns

December 31, 2022 (unaudited)

### Defined Benefit Plan Values and Annual Returns

($ millions)

| Year Ended | Pension Fund Fair Value | Annual Total Pension Fund Rate of Return[1/] |
|---|---|---|
| 1993 | $13,701 | 13.2% |
| 1994 | 13,330 | -1.1 |
| 1995 | 16,343 | 25.2 |
| 1996 | 18,492 | 15.4 |
| 1997 | 21,312 | 18.5 |
| 1998 | 24,123 | 16.3 |
| 1999 | 28,093 | 19.9 |
| 2000 | 27,880 | 2.2 |
| 2001 | 24,706 | -7.9 |
| 2002 | 20,880 | -10.9 |
| 2003 | 24,536 | 24.3 |
| 2004 | 26,641 | 15.1 |
| 2005 | 28,752 | 14.5 |
| 2006 | 32,053 | 16.4 |
| 2007 | 35,516 | 17.2 |
| 2008 | 22,796 | -28.7 |
| 2009 | 24,662 | 9.1 |
| 2010 | 25,886 | 11.9 |
| 2011 | 24,377 | 2.7 |
| 2012 | 25,389 | 12.0 |
| 2013 | 27,394 | 13.6 |
| 2014 | 27,338 | 6.4 |
| 2015 | 26,055 | 0.4 |
| 2016 | 26,388 | 6.5 |
| 2017 | 29,405 | 15.1 |
| 2018 | 26,937 | -4.6 |
| 2019 | 31,096 | 18.8 |
| 2020 | 35,028 | 11.1 |
| 2021 | 40,231 | 17.2 |
| 2022 | 33,607 | -12.2 |

[1/] Returns were calculated using the Modified Dietz day-weighted return methodology.

## Largest Assets Held

December 31, 2022 (unaudited)

### U.S. Equity

| Holding | Fair Value |
|---|---|
| Apple Inc | $514,232,666 |
| Microsoft Corp | 498,122,448 |
| Amazon.Com Inc | 196,173,012 |
| Berkshire Hathaway Inc | 146,670,045 |
| Alphabet Inc Class C | 140,752,488 |
| Alphabet Inc Class A | 139,678,501 |
| Johnson & Johnson | 133,433,991 |
| UnitedHealth Group Inc | 130,330,968 |
| Exxon Mobil Corporation | 119,957,206 |
| JPMorgan Chase & Co | 102,942,536 |

### Non-U.S. Equity

| Holding | Fair Value |
|---|---|
| Linde PLC | $60,888,347 |
| Accenture PLC | 44,496,371 |
| Medtronic PLC | 27,228,503 |
| LVMH Moet Hennessy Louis Vuitton | 26,485,250 |
| Novo Nordisk A/S | 26,439,031 |
| IShares MSCI India Small-Cap | 24,762,139 |
| Chubb Ltd | 24,042,973 |
| Taiwan Semiconductor Manufacturing Corp | 16,945,954 |
| Keyence Corp | 16,352,140 |
| Eaton Corp PLC | 16,202,576 |

### Non-U.S. Fixed Income

| Holding | Fair Value |
|---|---|
| United Kingdom Inflation-Regs, 0.125%, March 22, 2026 | $4,092,311 |
| Deutsche Bank AG/New York NY, Variable Rate, November 26, 2025 | 3,822,259 |
| United Kingdom Inflation-Regs, 0.125%, August 10, 2031 | 2,911,081 |
| Kreditanstalt Fuer Wiederaufbau, 2.875%, April 3, 2028 | 2,820,690 |
| Deutsche Bundesrepublik I Regs, 0.100%, April 15, 2033 | 2,472,892 |
| Province Of Ontario Canada, 3.050%, January 29, 2024 | 2,451,805 |
| French Republic Government 144A, 0.700%, July 25, 2030 | 2,308,086 |
| AIA Group Ltd Regs, 3.125%, March 13, 2023 | 2,291,899 |
| United Kingdom Inflation-Regs, 0.750%, March 22, 2034 | 2,024,479 |
| Mexico Government International 4.600%, February 10, 2048 | 2,020,480 |

Note: A detailed list of SERS investment holdings at December 31, 2022 may be viewed at www.SERS.pa.gov.

## Largest Assets Held

December 31, 2022 (unaudited)

### U.S. Government and Government Related Fixed Income

| Holding | Fair Value |
|---|---|
| U.S. Treasury Note, 2.750% August 15, 2032 | $98,975,831 |
| U.S. Treasury Inflation Index Note, 0.125% January 15, 2030 | 60,757,302 |
| U.S. Treasury Inflation Index Note, 0.375% January 15, 2027 | 60,462,674 |
| U.S. Treasury Inflation Index Note, 0.875% January 15, 2029 | 58,537,509 |
| U.S. Treasury Inflation Index Note, 0.125% April 15, 2027 | 57,277,968 |
| U.S. Treasury Inflation Index Note, 0.625% July 15, 2032 | 55,624,412 |
| U.S. Treasury Inflation Index Note, 0.750% February 15, 2042 | 54,117,272 |
| U.S. Treasury Inflation Index Note, 0.750% July 15, 2028 | 50,854,703 |
| U.S. Treasury Inflation Index Note, 3.625% April 15, 2028 | 44,833,305 |
| U.S. Treasury Inflation Index Note, 0.250% January 15, 2025 | 42,833,378 |

### U.S. Corporate Fixed Income

| Holding | Fair Value |
|---|---|
| BX Commercial Mortgage Trust 2019-XL, Variable Rate October 15, 2036 | $6,164,802 |
| Life 2021-BMR Mortgage Trust, Variable Rate March 15, 2038 | 5,298,453 |
| Bank of America Corp, Variable Rate April 22, 2032 | 4,802,305 |
| Veritas Pool A Mezzanine Term Loan, 0.000% November 2, 2023 | 4,626,343 |
| Bank of America Corp, Variable Rate December 20, 2028 | 4,423,511 |
| JP Morgan Chase & Co, Variable Rate February 1, 2028 | 4,204,328 |
| CAMB Commercial Mortgage Life Trust G, Variable Rate December 15, 2037 | 4,139,213 |
| CHC Commercial Mortgage Trust CHC F, Variable Rate June 15, 2034 | 3,548,272 |
| Broadstone Mezzanine A-3, 0.000% January 1, 2059 | 3,400,000 |
| Med Trust 2021-MDL MDLN G, Variable Rate November 15, 2038 | 3,340,352 |

Note: A detailed list of SERS investment holdings at December 31, 2022, may be viewed at www.SERS.pa.gov.

## Manager Fees & Expenses

**December 31, 2022 (unaudited)**

SERS pays manager fees and expenses to external investment managers hired by the SERS Board to manage SERS' assets. The manager fees cover the basic costs of running and administering a fund. Many of the investment managers are paid fees based on the amount of assets under management. For private market investments, the industry practice is for the limited partners to pay fees to the general partner based on commitments to the partnership during the investment period. Manager fees are inclusive of any incentive fees paid to a manager for exceeding certain performance thresholds. Manager expenses include, but are not limited to, operating and other recurring expenses such as legal expenses, office expenses, audit fees, accounting fees, custodial fees, and third-party vendor fees.

The managers of the SERS investment portfolio are paid from investment earnings. Their fees and expenses are treated as a reduction of the investment income of the SERS Fund, rather than as a direct administrative expense. Thus, when investment performance is reported, numbers are reported net-of-fees - that is, performance after all investment manager fees have been incurred.

### Manager Fees and Expenses

for the year ended December 31, 2022

($ thousands)

| Asset Class | Fees/Expenses | Fees/Expenses[1/] (In basis points) |
|---|---|---|
| Private Equity[2/] | $79,446 | 125.5 |
| Real Estate | 30,701 | 106.2 |
| U.S. Equity | 2,745 | 2.5 |
| International Developed Markets Equity | 6,177 | 13.9 |
| Emerging Markets Equity | 6,875 | 55.5 |
| Fixed Income | 9,238 | 12.5 |
| Inflation Protection (TIPS) | 1,116 | 10.5 |
| Legacy Private Credit[2/] | 11,397 | 139.3 |
| Legacy Hedge Funds | 2 | 0.0 |
| **Total Manager Fees and Expenses** | **$147,697** | **41.2** |

[1/]The fees/expenses were divided by SERS total fund and asset class quarterly average values during calendar year 2022 to arrive at the basis point calculations.

[2/]Effective July 1, 2022, thirteen funds were moved from the Private Credit asset class to the Private Equity asset class. The remaining funds were moved to Legacy Private Credit.

### History of Manager Fees and Expenses

| Calendar Year | Fees/Expenses | Fees/Expenses (In basis points) |
|---|---|---|
| 2018 | 124,427,862 | 43.3 |
| 2019 | 169,969,812 | 58.3[1/] |
| 2020 | 140,038,195 | 45.3 |
| 2021 | 163,242,575 | 43.6 |
| 2022 | 147,696,760 | 41.2 |

[1/]Fees include approximately $19 million in real estate incentive fees that were earned over a multi-year period but recorded in 2019.

### Annual Investment Manager Fees and Expenses Report

The Public Pension Management and Asset Investment Review Commission (PPMAIRC) was created as part of Act 2017-5. The PPMAIRC issued a report in December 2018, which outlined over 100 recommendations designed to achieve cost savings, streamline operations, and increase transparency at SERS. One recommendation was to publish investment management fees, costs and expenses by manager and aggregated by asset class. Because SERS has an ongoing commitment to demonstrate transparency, while working within its legal and fiduciary framework, the SERS Board adopted this recommendation. The inaugural annual report was prepared for the period ending December 31, 2019. Each report is presented to the SERS Board and is posted for all stakeholders to see on the SERS website.

## Schedule of Trading Broker Commissions

**December 31, 2022 (unaudited)**

Broker commissions on equity and fixed income investment transactions for the year ended December 31, 2022 were $1.2 million.

Below is a list of brokers receiving commissions in excess of $20,000 during the year.

| Broker Name | Commissions Paid | Shares (In thousands) | Average Cents Per Share |
|---|---|---|---|
| JP Morgan Chase | $234,394 | 53,506 | 0.4 |
| UBS | 135,326 | 141,742 | 0.1 |
| Bank of America | 108,723 | 4,646 | 2.3 |
| Goldman Sachs | 80,681 | 4,410 | 1.8 |
| Royal Bank of Canada | 73,744 | 38,306 | 0.2 |
| Nomura | 68,714 | 78,766 | 0.1 |
| TP ICAP | 61,553 | 5,484 | 1.1 |
| Morgan Stanley Smith Barney | 51,945 | 7,128 | 0.7 |
| Wells Fargo and Company | 40,187 | 1,396 | 2.9 |
| Apex Clearing | 38,393 | 1,280 | 3.0 |
| Citigroup | 34,203 | 5,458 | 0.6 |
| HSBC | 29,062 | 57,339 | 0.1 |
| Macquarie Group | 28,976 | 6,177 | 0.5 |
| Loop Capital Markets | 28,845 | 961 | 3.0 |
| Jefferies Group LLC | 24,039 | 5,189 | 0.5 |
| Bank of New York Mellon | 20,483 | 782 | 2.6 |

## Investment Summary

December 31, 2022 (unaudited)

The assets of SERS are administered by the board. The board adopted an investment policy that incorporates the provisions of the Retirement Code, which governs the investment of SERS' assets. SERS' investment plan is reviewed and updated regularly for strategic asset allocation purposes, as well as for diversification needs within each asset class.

Investments on the Statements of Fiduciary Net Position for financial reporting purposes are not based on the below asset allocation. The asset allocation is for investment reporting purposes only. As such, there may be differences between the Financial Section and the Investment Section.

### Asset Allocation

as of December 31, 2022

($ millions)

| Asset Class | Fair Value | % of Total Fund | Long-Term 10-Year Strategic Target |
|---|---|---|---|
| Private Equity | $6,569.4 | 19.5% | 16.0% |
| Real Estate | 2,853.4 | 8.5 | 7.0 |
| U.S. Equity | 10,413.3 | 30.9 | 31.0 |
| International Developed Markets Equity | 4,367.6 | 13.0 | 14.0 |
| Emerging Markets Equity | 1,148.8 | 3.4 | 5.0 |
| Fixed Income | 6,304.9 | 18.7 | 22.0 |
| Inflation Protection (TIPS) | 1,005.9 | 3.0 | 3.0 |
| Cash | 575.5 | 1.7 | 2.0 |
| Legacy Private Credit | 394.0 | 1.2 | * |
| Legacy Hedge Funds | 17.2 | 0.1 | ** |
| **Total Fund** | **$33,650.0** | **100.0%** | **100.0%** |

*SERS no longer has an asset allocation targeting this strategy as a stand-alone asset class.

**Legacy Hedge Funds are in liquidation.

### Number of Investment Managers and Portfolios

| Asset Class | Investment Managers | Investment Portfolios |
|---|---|---|
| Private Equity | 67 | 203 |
| Real Estate | 26 | 50 |
| U.S. Equity | 2 | 4 |
| International Developed Markets Equity | 9 | 9 |
| Emerging Markets Equity | 5 | 5 |
| Fixed Income | 7 | 10 |
| Inflation Protection (TIPS) | 3 | 3 |
| Cash | 1 | 1 |
| Legacy Private Credit | 6 | 7 |
| Legacy Hedge Funds | 2 | 2 |
| **Total** | **128** | **294** |

## Investment Summary - Private Equity

**December 31, 2022 (unaudited)**

### Objective

The objective of Private Equity is to achieve a return in excess of its public equity benchmark (75% Russell 3000 Index / 25% MSCI World ex U.S. Index plus a 300 basis point premium) over 10-year periods (annualized, net of fees).

### Structure

Private Equity investments are non-traditional investments made in the form of closed-end limited partnership structures organized to make domestic and international private investments such as buyouts, special situations, and growth equity.

**Private Equity**

as of December 31, 2022

($ millions)

| | Unfunded Commitments | Fair Value | % of Total Fund |
|---|---|---|---|
| **Core Sub-Asset Classes** | | | |
| Buyouts | $1,371.2 | $3,618.5 | 10.8% |
| Special Situations | 948.6 | 1,581.5 | 4.7 |
| Growth Equity | 264.2 | 1,152.0 | 3.4 |
| **Total Core Sub-Asset Classes** | **2,584.0** | **6,352.0** | **18.9** |
| **Non-Core Holdings**[1/] | | | |
| Keystone Legacy Fund | 36.3 | 217.4 | 0.6 |
| **Total Private Equity** | **$2,620.3** | **$6,569.4** | **19.5%** |

[1/]A total of 46 legacy holdings from the Private Equity core sub-asset classes (Buyouts, Special Situations, and Growth Equity) make up the Keystone Legacy Fund, a special purpose vehicle which is managed by a third-party.

## Investment Summary - Private Equity
December 31, 2022 (unaudited)

### Portfolio Exposure

The Private Equity program is well diversified by sub-sector, geography, and industry focus. As of September 30, 2022, based on fair value, the program's exposure was:

#### By Fund Sub-Sector

| | |
|---|---|
| U.S. Buyout | 35.3% |
| Non-U.S.[1/] | 29.1 |
| Distressed/Opportunistic | 17.5 |
| U.S. Growth Equity | 15.9 |
| Pennsylvania-Related | 2.2 |

#### By Geography[2/]

| | |
|---|---|
| United States | 68.8% |
| United Kingdom | 5.6 |
| Germany | 3.3 |
| China | 2.4 |
| India | 2.0 |
| South Korea | 1.7 |
| Brazil | 1.4 |
| Rest of World | 14.8 |

#### By Industry[2/]

| | |
|---|---|
| Information Technology | 36.5% |
| Financials | 13.5 |
| Consumer Discretionary | 11.6 |
| Industrials | 10.8 |
| Health Care | 10.7 |
| Telecommunication Services | 4.8 |
| Energy | 4.5 |
| Consumer Staples | 3.0 |
| Materials | 2.2 |
| Utilities | 1.4 |
| Real Estate | 1.0 |

[1/]Some managers with a domestic investment focus may invest globally. Thus, non-U.S. exposure measured on a portfolio company basis will be greater.

[2/]Geography and industry are determined by the portfolio company.

## Investment Summary - Private Equity

**December 31, 2022 (unaudited)**

The Capital Committed column represents total dollars allocated from SERS to each limited partnership. Accumulated Capital Drawn is the portion of SERS' capital commitments drawn by the general partner to be invested with underlying portfolio companies along with any reinvested capital. The Accumulated Distributions column shows the value of capital and profits returned to SERS.

### Buyouts Committed, Drawn, and Distributed

| Active Buyout Funds Limited Partnership | Strategy/ Stage | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions[2/] |
|---|---|---|---|---|---|
| ABRY Partners V | Small | 7/29/2005 | $45,000,000 | $41,752,543 | $84,778,199 |
| ABRY Partners VI | Middle | 3/26/2008 | 50,000,000 | 60,107,028 | 107,944,545 |
| ABRY Partners VII | Middle | 8/10/2011 | 30,000,000 | 38,327,711 | 51,418,870 |
| ABRY Partners VIII | Middle | 5/5/2015 | 25,000,000 | 29,797,547 | 37,018,048 |
| Advent Latin American Private Equity Fund IV | Small | 8/2/2007 | 30,000,000 | 30,797,073 | 43,955,921 |
| Advent International GPE VI-A | Middle | 7/7/2008 | 35,000,000 | 35,146,325 | 70,431,146 |
| Advent Latin American Private Equity Fund V | Small | 7/5/2011 | 15,000,000 | 14,430,000 | 8,774,997 |
| Advent International GPE VII-B | Global | 12/6/2012 | 40,000,000 | 38,400,000 | 61,725,466 |
| Advent Latin American Private Equity Fund VI | Small | 8/13/2015 | 25,000,000 | 23,250,000 | 12,292,073 |
| Advent International GPE VIII-B | Global | 9/26/2016 | 50,000,000 | 50,000,000 | 36,531,240 |
| Altaris Health Partners V | Middle | 4/22/2021 | 50,000,000 | 23,839,919 | 0 |
| Apollo Investment Fund IV | Large | 9/30/1998 | 75,000,000 | 74,838,620 | 124,814,033 |
| Apollo Investment Fund V | Large | 8/23/2001 | 50,000,000 | 44,972,146 | 122,673,016 |
| Apollo Investment Fund VI | Global | 7/19/2006 | 40,000,000 | 38,911,805 | 64,467,407 |
| Apollo Investment Fund IX | Global | 3/15/2019 | 85,400,000 | 70,250,764 | 22,684,071 |
| Asia Alternatives Capital Partners | Fund of Funds | 6/26/2007 | 25,000,000 | 25,218,098 | 43,740,125 |
| Asia Alternatives Capital Partners II | Fund of Funds | 3/7/2008 | 29,949,500 | 29,086,059 | 63,934,436 |
| Asia Alternatives Korea Buyout Investors (Hahn & Co) | Fund of Funds | 7/22/2011 | 7,000,000 | 8,891,037 | 12,677,843 |
| Asia Alternatives Capital Partners III | Fund of Funds | 8/3/2012 | 50,000,000 | 55,461,442 | 70,160,481 |
| Penn Asia Investors | Fund of Funds | 9/28/2012 | 133,000,000 | 124,541,781 | 98,797,916 |
| Asia Alternatives Capital Partners V | Fund of Funds | 10/5/2017 | 50,000,000 | 45,956,059 | 6,615,201 |
| Audax Private Equity Fund | Small | 5/25/2000 | 35,000,000 | 36,839,098 | 56,057,910 |
| Audax Private Equity Fund II | Small | 6/17/2005 | 25,000,000 | 25,517,152 | 46,325,622 |
| Audax Private Equity Fund III | Small | 11/7/2007 | 37,000,000 | 42,498,691 | 82,716,671 |
| Audax Private Equity Fund V | Small | 1/25/2016 | 50,000,000 | 44,939,958 | 66,216,789 |
| Audax Private Equity Fund VI | Small | 8/29/2019 | 75,000,000 | 63,039,819 | 34,866,104 |
| Berkshire Fund VI | Middle | 7/11/2002 | 20,000,000 | 18,819,615 | 55,273,814 |
| Berkshire Fund VII | Middle | 11/15/2006 | 32,000,000 | 32,613,937 | 68,596,870 |
| Blackstone Communications Partners I | Global | 8/29/2000 | 25,000,000 | 25,114,042 | 30,998,189 |
| Blackstone Capital IV | Global | 2/26/2003 | 69,379,875 | 69,119,097 | 193,120,867 |
| Blackstone Capital Partners V | Global | 5/30/2006 | 150,000,000 | 150,111,788 | 250,429,596 |
| Blackstone Capital Partners VII | Global | 10/21/2016 | 50,000,000 | 52,833,582 | 25,941,485 |

## Investment Summary - Private Equity

December 31, 2022 (unaudited)

### Buyouts Committed, Drawn, and Distributed (continued)

| Active Buyout Funds Limited Partnership | Strategy/ Stage | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions[2/] |
|---|---|---|---|---|---|
| Blackstone Capital Partners VIII | Global | 2/22/2021 | $70,000,000 | $32,001,958 | $1,321,314 |
| Capvis Equity IV | Small | 1/30/2014 | 43,132,946 | 46,342,729 | 33,984,236 |
| Carlyle Energy Mezzanine Opportunities Fund | Global | 9/5/2012 | 50,000,000 | 65,562,454 | 35,193,274 |
| Horizon Strategic Fund - Carlyle Group | Global | 1/23/2014 | 100,000,000 | 106,487,031 | 139,026,602 |
| CVC Capital Partners VII | Global | 12/3/2018 | 91,543,991 | 83,206,244 | 11,464,344 |
| CVC Capital Partners VIII | Global | 12/13/2021 | 53,868,033 | 17,893,108 | 0 |
| Eureka II | Small | 1/30/2006 | 20,000,000 | 21,906,935 | 23,150,416 |
| Eureka Growth Capital III | Small | 10/21/2013 | 20,000,000 | 15,893,523 | 40,332,770 |
| Francisco Partners II | Global | 7/10/2006 | 30,000,000 | 29,383,916 | 48,613,520 |
| Francisco Partners III | Global | 10/17/2011 | 20,000,000 | 20,514,684 | 58,281,352 |
| Francisco Partners IV | Global | 4/15/2015 | 25,000,000 | 24,656,280 | 48,419,069 |
| Francisco Partners VII | Global | * | 100,000,000 | 0 | 0 |
| Francisco Partners Agility III | Middle | * | 30,000,000 | 0 | 0 |
| Francisco Partners Sidecar | Co-Investment | * | 50,000,000 | 0 | 0 |
| FSN Capital IV | Small | 12/19/2013 | 38,026,457 | 38,520,666 | 82,280,821 |
| FSN Capital V | Small | 1/4/2017 | 80,526,702 | 82,318,034 | 23,602,863 |
| Great Hill Equity Partners IV | Middle | 9/8/2008 | 25,000,000 | 25,125,662 | 60,470,403 |
| GTCR VIII | Middle | 7/7/2003 | 75,000,000 | 69,393,599 | 120,471,948 |
| GTCR Fund XI | Middle | 9/2/2014 | 25,000,000 | 24,249,240 | 47,807,055 |
| GTCR Fund XII | Middle | 5/4/2018 | 32,500,000 | 32,302,193 | 19,642,335 |
| H.I.G. Growth Buyouts & Equity Fund II | Small | 7/20/2011 | 15,000,000 | 16,437,126 | 18,130,531 |
| H.I.G. Europe Capital Partners II | Middle | 1/10/2014 | 24,436,963 | 22,568,576 | 17,832,358 |
| H.I.G. Brazil and Latin America Partners | Middle | 8/12/2015 | 50,000,000 | 51,442,736 | 13,658,868 |
| Hahn & Company II | Small | 5/29/2015 | 50,000,000 | 56,147,396 | 57,500,334 |
| Hahn & Company III | Middle | 12/20/2018 | 56,250,000 | 34,265,266 | 3,225,355 |
| Hahn & Company III - Supplemental Fund | Middle | 12/20/2018 | 18,750,000 | 16,519,660 | 57,377 |
| HarbourVest IPEP III | Fund of Funds | 6/30/1998 | 40,000,000 | 39,400,000 | 61,092,165 |
| HIPEP V-Asia Pacific & Rest of World | Fund of Funds | 5/9/2006 | 30,000,000 | 28,245,316 | 38,492,130 |
| Horizon Impact Fund | Fund of Funds | 10/24/2014 | 50,000,000 | 42,649,604 | 59,093,766 |
| Horizon Impact Fund B | Fund of Funds | 5/31/2017 | 100,000,000 | 85,000,000 | 24,255,000 |
| HarbourVest PA Co-Investment Fund | Co-Investment | 5/14/2020 | 200,000,000 | 139,275,000 | 3,300,000 |
| Hellman & Friedman Capital Partners VI | Global | 6/5/2007 | 125,000,000 | 119,913,412 | 225,852,507 |
| Hellman & Friedman Capital Partners VIII | Global | 9/1/2016 | 50,000,000 | 51,265,986 | 26,777,195 |
| Hellman & Friedman Capital Partners IX | Global | 1/1/2019 | 90,000,000 | 89,035,742 | 3,017,970 |
| Hellman & Friedman Capital Partners X | Global | 11/24/2021 | 100,000,000 | 54,509,574 | 0 |
| Hellman & Friedman Capital Partners XI | Global | * | 100,000,000 | 0 | 0 |
| Incline Equity Partners III | Small | 1/14/2013 | 15,000,000 | 16,006,245 | 41,866,592 |
| Kelso VII | Global | 10/18/2004 | 40,000,000 | 41,169,937 | 65,821,118 |
| Kelso VIII | Global | 11/29/2007 | 150,000,000 | 146,686,760 | 208,554,873 |

## Investment Summary - Private Equity

December 31, 2022 (unaudited)

### Buyouts Committed, Drawn, and Distributed (continued)

| Active Buyout Funds Limited Partnership | Strategy/ Stage | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions[2/] |
|---|---|---|---|---|---|
| LLR Equity Partners III | Small | 7/24/2008 | $30,000,000 | $29,108,722 | $65,168,492 |
| LLR Equity Partners IV | Small | 3/14/2014 | 50,000,000 | 45,485,764 | 94,788,431 |
| LLR Equity Partners V | Small | 3/21/2018 | 75,000,000 | 72,090,002 | 23,739,486 |
| LLR Equity Partners VI | Small | 5/13/2021 | 50,000,000 | 26,747,962 | 0 |
| Madison Dearborn Capital Partners V | Middle | 12/14/2006 | 63,817,077 | 71,571,265 | 116,191,907 |
| Madison Dearborn Capital Partners VI | Middle | 5/27/2008 | 50,000,000 | 53,258,583 | 112,050,064 |
| NGP XII | Middle | 11/14/2018 | 75,000,000 | 53,541,498 | 19,311,606 |
| NGP Keystone | Co-Investment | 11/1/2021 | 25,000,000 | 10,150,000 | 0 |
| Neuberger Berman PA Co-Investment Fund | Co-Investment | 1/6/2021 | 200,000,000 | 70,743,110 | 10,474,930 |
| Oaktree Power Opportunities Fund III | Large | 10/18/2010 | 25,000,000 | 19,267,532 | 29,090,735 |
| Permira European Fund II | Large | 6/7/2000 | 45,672,612 | 45,672,612 | 91,560,959 |
| Permira European Fund III | Large | 1/12/2004 | 127,062,518 | 127,340,454 | 218,052,206 |
| Permira IV | Global | 12/14/2006 | 136,401,782 | 138,422,695 | 208,443,061 |
| Permira VI | Global | 1/10/2017 | 56,456,336 | 51,674,024 | 28,972,718 |
| Permira VII | Global | 2/4/2020 | 75,792,183 | 66,838,715 | 5,589,425 |
| Permira Susquehanna Opportunities - Buyout | Co-Investment | 1/26/2021 | 40,000,000 | 18,557,655 | 0 |
| Primavera Capital Fund II | Global | 11/17/2015 | 50,000,000 | 56,553,845 | 20,617,133 |
| Primavera Capital Fund III | Global | 4/12/2019 | 75,000,000 | 78,937,325 | 9,423,349 |
| Providence Equity Partners IV | Middle | 11/27/2000 | 25,000,000 | 23,420,840 | 56,065,270 |
| Providence Equity Partners V | Middle | 4/4/2005 | 45,000,000 | 42,692,347 | 52,204,745 |
| Providence Equity Partners VI | Large | 3/16/2007 | 49,976,748 | 54,530,937 | 76,267,775 |
| Ridgemont Equity Partners II | Small | 11/30/2015 | 50,000,000 | 50,971,205 | 51,472,519 |
| Sentinel Capital Partners V | Middle | 7/15/2014 | 10,000,000 | 10,106,202 | 16,933,051 |
| Sentinel Capital Partners VII | Large | * | 100,000,000 | 0 | 0 |
| Silver Lake Partners V | Global | 6/12/2018 | 78,000,000 | 77,305,381 | 22,053,745 |
| Sterling Group Partners IV | Small | 6/15/2016 | 20,000,000 | 20,059,401 | 16,321,713 |
| TDR Capital IV | Middle | 11/16/2018 | 86,989,447 | 72,540,172 | 23,812,536 |
| Thoma Bravo Fund XIII | Global | 2/14/2019 | 75,000,000 | 91,498,386 | 45,140,596 |
| Thoma Bravo Fund XIV | Global | 4/15/2021 | 50,000,000 | 47,072,121 | 12 |
| Thoma Bravo Discover Fund III | Middle | 6/11/2021 | 20,000,000 | 18,488,934 | 0 |
| Thoma Bravo Fund XV | Global | 6/10/2022 | 100,000,000 | 30,592,141 | 2,113 |
| Thoma Bravo Discover Fund IV | Middle | * | 50,000,000 | 0 | 0 |
| Thoma Bravo Sidecar | Co-Investment | * | 50,000,000 | 0 | 0 |
| TPG Partners IV | Global | 12/29/2003 | 27,907,484 | 27,981,463 | 58,314,713 |
| Newbridge Asia IV | Global | 9/27/2005 | 40,000,000 | 38,903,378 | 87,467,582 |
| TPG Partners V | Global | 6/27/2006 | 88,831,038 | 92,531,812 | 130,072,991 |
| TPG Asia V | Global | 2/19/2008 | 22,500,000 | 21,964,311 | 28,780,401 |
| TPG Partners VI | Global | 5/22/2008 | 44,294,641 | 50,576,261 | 72,434,127 |

## Investment Summary - Private Equity

December 31, 2022 (unaudited)

### Buyouts Committed, Drawn, and Distributed (continued)

| Active Buyout Funds Limited Partnership | Strategy/ Stage | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions[2/] |
|---|---|---|---|---|---|
| TSG8 | Large | 1/3/2020 | $100,000,000 | $71,652,621 | $708,467 |
| TSG9 | Large | * | 100,000,000 | 0 | 0 |
| Veritas Capital Fund VIII | Global | * | 100,000,000 | 0 | 0 |
| Veritas Capital Fund VIII Sidecar | Co-Investment | * | 25,000,000 | 0 | 0 |
| Vista Equity Partners Fund VI | Global | 12/29/2016 | 150,000,000 | 187,372,613 | 151,993,242 |
| Vista Equity Partners Fund VII | Global | 2/13/2019 | 75,000,000 | 60,246,141 | 589,405 |
| Wind Point Partners VIII | Small | 9/14/2017 | 100,000,000 | 98,328,319 | 105,528,717 |
| Wind Point Partners IX-A | Middle | 2/26/2020 | 75,000,000 | 65,582,341 | 1,434,440 |
| **Total Active Buyouts** | | | **$6,801,466,333** | **$5,542,098,418** | **$5,769,642,074** |

Cash flows as of September 30, 2022.

*Not funded as of September 30, 2022.

[1/]Commitments as of December 31, 2022.

[2/]Distributions include stock distributions. Distributions may include fees that are recorded as negative distributions to be offset against future distributions of the underlying limited partnership investment.

## Investment Summary - Private Equity

**December 31, 2022 (unaudited)**

The Capital Committed column represents total dollars allocated from SERS to each limited partnership. Accumulated Capital Drawn is the portion of SERS' capital commitments drawn by the general partner to be invested with underlying portfolio companies along with any reinvested capital. The Accumulated Distributions column shows the value of capital and profits returned to SERS.

### Special Situations Committed, Drawn, and Distributed

| Active Special Situations Funds Limited Partnership | Strategy/ Stage | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions[2/] |
|---|---|---|---|---|---|
| ABRY Senior Equity II | Mezzanine | 7/27/2006 | $30,000,000 | $28,388,642 | $45,127,413 |
| ABRY Advanced Securities Fund | Mezzanine | 8/1/2008 | 7,262,950 | 23,529,104 | 38,786,236 |
| ADV Opportunities Fund I | Distressed/ Turnaround | 10/5/2015 | 50,000,000 | 61,566,351 | 34,879,744 |
| AXA Secondary Fund III | Secondaries | 11/19/2004 | 26,000,000 | 21,737,894 | 37,244,706 |
| AXA Secondary Fund III-2 | Secondaries | 11/24/2004 | 14,000,000 | 11,677,210 | 19,062,764 |
| AXA Secondary Fund IV | Secondaries | 2/26/2007 | 80,000,000 | 70,134,752 | 99,618,118 |
| AXA Secondary Fund V B | Secondaries | 6/19/2012 | 75,000,000 | 61,682,742 | 97,816,150 |
| ASF VII B | Secondaries | 2/19/2016 | 100,000,000 | 65,938,925 | 46,531,810 |
| ASF VII PA Co-Invest | Secondaries | 5/18/2016 | 50,000,000 | 30,376,259 | 25,049,900 |
| ASF VIII B | Secondaries | 6/13/2019 | 100,000,000 | 47,817,186 | 8,803,917 |
| ASF VIII PA Co-Invest | Secondaries | 3/12/2020 | 50,000,000 | 23,388,233 | 2,445,110 |
| ASF IX B | Secondaries | * | 100,000,000 | 0 | 0 |
| ASF IX B Sidecar | Secondaries | * | 50,000,000 | 0 | 0 |
| Ares PA Opportunities Fund - Distressed Debt | Distressed/ Turnaround | 12/20/2019 | 200,000,000 | 115,407,537 | 12,425,293 |
| Ares PA Opportunities Fund - Diversified Credit | Distressed/ Turnaround | 12/15/2020 | 100,000,000 | 32,110,485 | 795,306 |
| Ares PA Opportunities Fund - Special Situations | Distressed/ Turnaround | 2/22/2021 | 100,000,000 | 80,858,200 | 10,623,117 |
| Avenue Special Situations Fund VI | Distressed/ Turnaround | 11/2/2010 | 20,000,000 | 20,068,464 | 21,075,410 |
| Centerbridge Capital Partners I | Distressed/ Turnaround | 2/27/2007 | 50,000,000 | 57,337,396 | 117,317,806 |
| Centerbridge Capital Partners III | Distressed/ Turnaround | 5/21/2015 | 30,000,000 | 39,046,310 | 34,171,080 |
| Clearlake Capital Partners IV | Distressed/ Turnaround | 9/1/2015 | 15,000,000 | 23,358,908 | 35,754,798 |
| Clearlake Capital Partners V | Distressed/ Turnaround | 2/1/2018 | 55,000,000 | 77,646,490 | 96,626,029 |
| Clearlake Opportunities Partners II | Distressed/ Turnaround | 8/30/2019 | 75,000,000 | 35,498,908 | 13,071,618 |
| Clearlake Capital Partners VI | Distressed/ Turnaround | 5/22/2020 | 60,000,000 | 60,712,437 | 5,025,825 |
| Clearlake Capital Partners VII | Distressed/ Turnaround | 4/26/2022 | 100,000,000 | 34,482,593 | 2,434 |
| Clearlake Opportunities Partners III | Distressed/ Turnaround | * | 75,000,000 | 0 | 0 |
| Glendon Opportunities Fund II | Distressed/ Turnaround | 10/18/2019 | 150,000,000 | 120,000,000 | 0 |
| H.I.G. Bayside Debt & LBO Fund II | Distressed/ Turnaround | 6/17/2008 | 30,000,000 | 31,448,253 | 49,922,160 |

## Investment Summary - Private Equity

December 31, 2022 (unaudited)

### Special Situations Committed, Drawn, and Distributed (continued)

| Active Special Situations Funds Limited Partnership | Strategy/ Stage | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions[2/] |
|---|---|---|---|---|---|
| H.I.G. Bayside Loan Opp. Fund III | Distressed/ Turnaround | 6/12/2013 | $50,000,000 | $42,696,553 | $49,904,323 |
| H.I.G. Bayside Loan Opp. Fund IV | Distressed/ Turnaround | 1/16/2015 | 25,000,000 | 22,626,299 | 20,452,258 |
| Dover Street VII | Secondaries | 7/2/2008 | 30,000,000 | 28,696,128 | 40,749,123 |
| HPS Mezzanine Partners 2019 | Mezzanine | 11/16/2020 | 75,000,000 | 70,351,768 | 13,665,301 |
| ICG Europe Fund VII | Mezzanine | 8/24/2018 | 90,127,911 | 69,909,022 | 14,310,490 |
| ICG Europe Mid-Market Fund | Mezzanine | 4/8/2020 | 73,380,097 | 38,689,381 | 821 |
| KPS Special Situations Fund IV | Distressed/ Turnaround | 5/8/2014 | 25,000,000 | 23,664,899 | 24,498,289 |
| KPS Special Situations Mid-Cap Fund | Distressed/ Turnaround | 11/25/2019 | 25,000,000 | 13,549,226 | 1,815,403 |
| KPS Special Situations Fund V | Distressed/ Turnaround | 7/13/2020 | 75,000,000 | 42,261,702 | 2,093,983 |
| LBC Credit Partners III | Mezzanine | 3/4/2013 | 50,000,000 | 46,696,243 | 53,797,275 |
| Lexington Capital Partners III | Secondaries | 1/26/1999 | 35,000,000 | 34,516,449 | 43,576,611 |
| Lexington Capital Partners V | Secondaries | 1/17/2002 | 75,000,000 | 74,623,418 | 125,170,164 |
| Lexington Capital Partners VI | Secondaries | 10/21/2005 | 50,000,000 | 53,066,325 | 73,712,907 |
| OCM Opportunities Fund VII | Distressed/ Turnaround | 5/16/2007 | 40,000,000 | 40,000,000 | 54,885,803 |
| OCM Opportunities Fund VII b | Distressed/ Turnaround | 6/3/2008 | 40,000,000 | 36,000,000 | 62,318,740 |
| OCM Opportunities Fund VIII | Distressed/ Turnaround | 9/20/2010 | 12,500,000 | 12,583,425 | 18,176,218 |
| OCM Opportunities Fund VIII b | Distressed/ Turnaround | 8/22/2011 | 12,500,000 | 12,500,000 | 14,285,884 |
| Oaktree Opportunities Fund IX | Distressed/ Turnaround | 3/26/2013 | 50,000,000 | 50,000,000 | 36,583,854 |
| Platinum Equity Capital Partners III | Distressed/ Turnaround | 8/5/2013 | 50,000,000 | 47,112,591 | 88,903,502 |
| RRJ Capital Master Fund III | Mezzanine | 12/10/2015 | 50,000,000 | 50,952,419 | 45,549,274 |
| Sentinel Junior Capital II | Mezzanine | * | 25,000,000 | 0 | 0 |
| Sixth Street TAO 4.0 (B) | Distressed/ Turnaround | 11/9/2017 | 100,000,000 | 91,934,516 | 43,479,252 |
| Sixth Street Opportunities Partners IV (A) | Distressed/ Turnaround | 1/25/2019 | 50,000,000 | 40,045,949 | 5,821,838 |
| Sixth Street TAO Contingent (D) | Distressed/ Turnaround | 4/16/2020 | 150,000,000 | 85,198,554 | 16,717,554 |
| Sixth Street Opportunities Partners V | Distressed/ Turnaround | 6/7/2022 | 50,000,000 | 10,857,933 | 6,132 |
| **Total Active Special Situations** | | | **$3,100,770,958** | **$2,212,746,079** | **$1,702,651,743** |

Cash flows as of September 30, 2022.

*Not funded as of September 30, 2022.

1/Commitments as of December 31, 2022.

2/Distributions include stock distributions. Distributions may include fees that are recorded as negative distributions to be offset against future distributions of the underlying limited partnership investment.

## Investment Summary - Private Equity

**December 31, 2022 (unaudited)**

The Capital Committed column represents total dollars allocated from SERS to each limited partnership. Accumulated Capital Drawn is the portion of SERS' capital commitments drawn by the general partner to be invested with underlying portfolio companies along with any reinvested capital. The Accumulated Distributions column shows the value of capital and profits returned to SERS.

### Growth Equity Committed, Drawn, and Distributed

| Active Growth Equity Funds Limited Partnership | Strategy/ Stage | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions[2/] |
|---|---|---|---|---|---|
| Battery Ventures VIII | Venture Capital | 8/13/2007 | $25,000,000 | $25,050,751 | $60,396,581 |
| Battery Ventures VIII Side Car Fund | Venture Capital | 8/29/2008 | 6,768,000 | 6,803,790 | 18,828,496 |
| HarbourVest Partners VI | Fund of Funds | 5/7/1999 | 200,000,000 | 196,586,055 | 251,227,115 |
| HarbourVest Partners VII | Fund of Funds | 3/24/2003 | 75,000,000 | 73,687,500 | 117,075,996 |
| HarbourVest Partners VIII | Fund of Funds | 10/5/2006 | 100,000,000 | 98,000,000 | 175,678,948 |
| Insight Venture Partners VII | Large | 4/27/2011 | 20,000,000 | 22,129,992 | 53,076,524 |
| Insight Venture Partners VIII | Large | 7/10/2013 | 50,000,000 | 54,316,419 | 112,350,209 |
| Insight Venture Partners IX | Large | 3/24/2015 | 50,000,000 | 52,784,788 | 54,495,120 |
| Insight Venture Partners X | Large | 4/17/2018 | 100,000,000 | 102,723,487 | 43,430,287 |
| Insight Partners XI | Large | 3/25/2020 | 75,000,000 | 72,975,000 | 133,132 |
| Insight Partners XII | Large | 8/27/2021 | 50,000,000 | 29,539,234 | 13,043 |
| JMI Equity Fund VI | Medium | 6/27/2007 | 40,000,000 | 40,000,246 | 70,593,347 |
| JMI Equity Fund VII | Medium | 2/14/2011 | 10,000,000 | 9,780,000 | 23,216,560 |
| JMI Equity Fund VIII | Medium | 10/1/2015 | 25,000,000 | 27,275,000 | 47,848,119 |
| Lightspeed Venture Partners VII | Venture Capital | 2/27/2006 | 18,000,000 | 18,000,000 | 53,968,729 |
| Lightspeed Venture Partners VIII | Venture Capital | 6/27/2008 | 15,000,000 | 15,000,000 | 36,819,713 |
| Lightspeed India Partners I | Venture Capital | 8/14/2015 | 15,000,000 | 14,137,500 | 2,125,958 |
| Meritech Capital Partners IV | Venture Capital | 2/10/2011 | 20,000,000 | 20,000,000 | 44,043,149 |
| Meritech Capital Partners V | Venture Capital | 9/3/2014 | 23,000,000 | 22,310,000 | 147,276,664 |
| New Enterprise Associates IX | Venture Capital | 11/15/1999 | 20,000,000 | 19,600,000 | 8,739,870 |
| New Enterprise Associates X | Venture Capital | 12/11/2000 | 35,000,000 | 35,028,000 | 39,412,034 |
| New Enterprise Associates 11 | Venture Capital | 3/1/2004 | 25,000,000 | 25,000,000 | 63,385,828 |
| New Enterprise Associates 12 | Venture Capital | 6/26/2006 | 35,000,000 | 35,631,130 | 48,025,951 |
| NewSpring Growth Capital II | Small | 4/20/2007 | 10,000,000 | 9,850,000 | 19,617,977 |
| Providence Strategic Growth II | Small | 12/7/2016 | 60,000,000 | 78,342,165 | 125,642,940 |
| Providence Strategic Growth III | Small | 7/26/2018 | 75,000,000 | 67,313,012 | 68,736,745 |
| Providence Strategic Growth IV | Small | 3/27/2020 | 75,000,000 | 56,559,825 | 35,816,731 |
| Providence Strategic Growth Europe | Small | 5/7/2021 | 71,531,229 | 51,661,879 | 4,449,647 |
| PSG V | Small | 12/23/2021 | 50,000,000 | 17,121,360 | 1,272,118 |
| PSG Europe II | Small | * | 69,722,216 | 0 | 0 |
| T. Rowe Price Stock Distribution Account[3/] | Various | 1/3/2005 | 0 | 1,403,870,495 | 1,463,316,881 |

## Investment Summary - Private Equity

December 31, 2022 (unaudited)

### Growth Equity Committed, Drawn, and Distributed (continued)

| Active Growth Equity Funds Limited Partnership | Strategy/ Stage | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions[2/] |
|---|---|---|---|---|---|
| TCV X | Large | 5/17/2019 | $75,000,000 | $56,289,972 | $0 |
| Weathergage Venture Capital | Fund of Funds | 6/26/2007 | 25,000,000 | 22,875,000 | 45,461,479 |
| Weathergage Venture Capital II | Fund of Funds | 6/29/2010 | 25,000,000 | 23,250,000 | 54,829,514 |
| **Total Active Growth Equity** | | | **$1,569,021,445** | **$2,803,492,600** | **$3,291,305,405** |

Cash flows as of September 30, 2022.

*Not funded as of September 30, 2022.

[1/]Commitments as of December 31, 2022.

[2/]Distributions include stock distributions. Distributions may include fees that are recorded as negative distributions to be offset against future distributions of the underlying limited partnership investment.

[3/]T. Rowe Price acts as a stock liquidation account. All cash and stock distributions are reflected in the corresponding distributions.

The Capital Committed column represents total dollars allocated from SERS to each limited partnership. Accumulated Capital Drawn is the portion of SERS' capital commitments drawn by the general partner to be invested with underlying portfolio companies along with any reinvested capital. The Accumulated Distributions column shows the value of capital and profits returned to SERS.

### Legacy Private Equity Committed, Drawn, and Distributed

| Legacy Private Equity Funds Limited Partnership | Strategy/ Stage | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions[2/] |
|---|---|---|---|---|---|
| Keystone Legacy Fund[3/] | Various | 7/1/2018 | $1,556,558,167 | $1,561,943,600 | $1,824,623,019 |
| **Total Legacy Private Equity** | | | **$1,556,558,167** | **$1,561,943,600** | **$1,824,623,019** |

Cash flows as of September 30, 2022.

[1/]Commitments as of September 30, 2022.

[2/]Distributions include stock distributions. Distributions may include fees that are recorded as negative distributions to be offset against future distributions of the underlying limited partnership investment.

[3/]A total of 46 legacy holdings from the Private Equity core sub-asset classes (Buyouts, Special Situations, and Growth Equity) make up the Keystone Legacy Fund, a special purpose vehicle which is managed by a third-party.

## Investment Summary - Real Estate

**December 31, 2022 (unaudited)**

### Objective

The objective of Real Estate is to generate returns through capital appreciation and current income to achieve a return in excess of its benchmark (NCREIF Fund Index – Open End Diversified Core Equity ("NFI-ODCE")) over 5-year periods (annualized, net of fees). Real Estate investments may also lower overall fund volatility and provide a moderate hedge against inflation.

### Structure

Real Estate investments are non-traditional investments made in the form of individually managed accounts and pooled investment vehicles organized to invest in private market equity and debt investments in real estate and real estate related companies and public market investments in real estate investment trusts (REITs) and real estate operating companies.

**Real Estate**

as of December 31, 2022

($ millions)

| Sub-Asset Class | Fair Value | % of Total Fund |
|---|---|---|
| Core/Core Plus[1/] | $1,273.6 | 3.8% |
| Value Add/Opportunistic Funds[2/] | 762.0 | 2.3 |
| Value Add/Opportunistic SMA | 526.8 | 1.6 |
| Real Estate Securities | 290.5 | 0.8 |
| Legacy Real Assets | 0.5 | 0.0 |
| **Total Real Estate** | **$2,853.4** | **8.5%** |

[1/]Unfunded commitments are $21.9 million.

[2/]Unfunded commitments are $426.3 million.

**Investment Summary - Real Estate**
**December 31, 2022 (unaudited)**

The Capital Committed column represents total dollars allocated from SERS to each fund/manager. Accumulated Capital Drawn is the portion of SERS' capital commitments drawn by the fund/manager to be invested. This amount may also include recycled capital (capital that was distributed and later recalled by the manager to be reinvested) as well as manager fees paid outside of the fund. The Accumulated Distributions column shows the value of capital and profits returned to SERS.

## Real Estate

| Active Fund / Manager | Asset Type | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions |
|---|---|---|---|---|---|
| **Core/Core Plus Real Estate** | | | | | |
| Blackstone Property Partners | Diversified | 2017 | $300,000,000 | $300,000,000 | $9,748,156 |
| Heitman America Real Estate Trust | Diversified | 2007 | 100,000,000 | 100,000,000 | 94,568,377 |
| Henderson Park Enhanced Income Fund | Diversified | 2019 | 340,291,953 | 318,867,566 | 65,810,167 |
| Oak Street Real Estate Capital Net Lease Property Fund | Diversified | 2019 | 309,743,743 | 309,743,743 | 31,612,627 |
| UBS Trumbull Property Fund | Diversified | 1988 | 25,558,525 | 25,558,525 | 125,194,232 |
| **Total Core/Core Plus Real Estate** | | | **1,075,594,221** | **1,054,169,834** | **326,933,559** |
| | | | | | |
| **Value Add/Opportunistic Funds** | | | | | |
| Activum SG Fund VI | Diversified | 2019 | 56,361,791 | 48,293,986 | 0 |
| Activum SG Fund VI Pennsylvania Side-Car | Diversified | 2021 | 53,544,144 | 32,672,729 | 0 |
| AG Asia Realty Fund | Diversified | 2007 | 25,000,000 | 23,500,000 | 27,487,500 |
| Berwind Investment Partnership VI | Diversified | 2002 | 24,543,712 | 24,543,712 | 44,831,120 |
| Berwind Investment Partnership VII | Diversified | 2005 | 25,000,000 | 25,000,000 | 17,497,341 |
| Berwind Investment Partnership IX | Diversified | 2012 | 25,000,000 | 24,303,409 | 40,087,976 |
| Blackstone Real Estate Partners IV | Diversified | 2003 | 25,000,000 | 25,000,000 | 40,994,391 |
| Blackstone Real Estate Partners V | Diversified | 2006 | 50,000,000 | 47,912,974 | 100,208,300 |
| Blackstone Real Estate Partners VI | Diversified | 2007 | 75,000,000 | 71,319,075 | 153,141,400 |
| Blackstone Real Estate Partners VII | Diversified | 2011 | 75,000,000 | 66,651,613 | 119,944,217 |
| Blackstone Real Estate Partners X | Diversified | * | 75,000,000 | 0 | 0 |
| Blue Moon Senior Housing II | Senior Housing | 2020 | 50,000,000 | 28,354,119 | 0 |
| Blue Moon Senior Housing II Sidecar | Senior Housing | 2020 | 50,000,000 | 29,287,411 | 0 |
| C-III Recovery Fund III | Diversified | 2017 | 100,000,000 | 86,316,255 | 8,072,741 |
| Colony Investors VIII | Diversified | 2007 | 22,500,000 | 21,655,800 | 8,350,233 |
| Hawkeye Scout Fund II | Diversified | 2016 | 30,000,000 | 30,000,000 | 605,865 |
| LEM Multifamily Fund VI | Multifamily | 2022 | 75,000,000 | 11,250,000 | 554,348 |
| Lubert Adler Fund VII | Diversified | 2014 | 25,000,000 | 24,375,000 | 13,463,917 |
| Mesirow Financial Real Estate Value Fund III | Multifamily | 2018 | 25,647,559 | 25,647,559 | 7,229,822 |
| Oak Street Real Estate Capital Fund IV | Diversified | 2017 | 100,000,000 | 100,000,000 | 110,140,777 |
| Oak Street Real Estate Capital Fund V | Diversified | 2020 | 50,000,000 | 27,460,000 | 7,234,372 |
| Oak Street Real Estate Fund VI | Diversified | * | 75,000,000 | 0 | 0 |

## Investment Summary - Real Estate

December 31, 2022 (unaudited)

### Real Estate (continued)

| Active Fund / Manager | Asset Type | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions |
|---|---|---|---|---|---|
| Prudential Senior Housing Fund V | Senior Housing | 2015 | $45,727,881 | $41,137,690 | $4,886,698 |
| Prudential Senior Housing Fund VI | Senior Housing | 2019 | 100,000,000 | 55,508,772 | 0 |
| Rockpoint Real Estate Fund II | Diversified | 2005 | 34,138,784 | 34,138,784 | 31,202,182 |
| Rockpoint Real Estate Fund III | Diversified | 2007 | 50,632,887 | 46,391,722 | 68,151,141 |
| Rockpoint Real Estate Fund V | Diversified | 2015 | 50,000,000 | 41,336,913 | 25,396,310 |
| Rubicon First Ascent | Office | 2021 | 30,000,000 | 5,679,551 | 0 |
| Rubicon First Ascent Sidecar | Office | 2022 | 20,000,000 | 4,852,389 | 0 |
| SRE Opportunity Fund III | Diversified | 2017 | 50,000,000 | 34,313,561 | 13,863,561 |
| SRE Opportunity Fund III Select | Diversified | 2017 | 50,000,000 | 29,537,500 | 18,329,003 |
| Starwood Fund VI | Diversified | 2001 | 50,000,000 | 50,000,000 | 51,927,126 |
| Starwood Fund VII | Diversified | 2006 | 35,000,000 | 35,000,000 | 27,295,581 |
| Starwood Fund VIII | Diversified | 2009 | 50,000,000 | 45,356,281 | 72,256,025 |
| ValStone Opportunity Fund V | Diversified | 2014 | 14,663,402 | 14,663,402 | 9,029,834 |
| Westbrook Fund V | Diversified | 2004 | 25,000,000 | 25,000,000 | 52,005,779 |
| Westbrook Fund VI | Diversified | 2006 | 35,000,000 | 35,000,000 | 38,837,150 |
| Westbrook Fund VII | Diversified | 2007 | 50,000,000 | 50,000,000 | 56,575,755 |
| Westbrook Fund VIII | Diversified | 2009 | 50,000,000 | 50,000,000 | 63,418,319 |
| **Total Value Add/Opportunistic Funds** | | | **1,852,760,160** | **1,371,460,207** | **1,233,018,784** |
| **Value Add/ Opportunistic SMA[2/]** | | | | | |
| Heitman I.M.A. | Diversified | 1988 | NA | 813,635,039 | 1,230,476,873 |
| hotelAVE I.M.A. | Hotel | 2018 | NA | 63,048,685 | 20,191,396 |
| LaSalle I.M.A. | Diversified | 1994 | NA | 457,193,866 | 778,848,456 |
| LaSalle Takeover I.M.A. | Diversified | 2018 | NA | 273,818,219 | 172,440,449 |
| **Total Value Add/Opportunistic SMA** | | | **NA** | **1,607,695,809** | **2,201,957,174** |
| **Legacy Real Assets[2/]** | | | | | |
| Forest I.M.A. | Timberland | 1992 | NA | 124,231,969 | 247,882,576 |
| **Total Legacy Real Assets** | | | **NA** | **124,231,969** | **247,882,576** |
| **Real Estate Securities[2/]** | | | | | |
| CenterSquare Real Estate Securities | Diversified | 2002 | NA | 183,616,773 | 36,168,336 |
| **Total Real Estate Securities** | | | **NA** | **183,616,773** | **36,168,336** |
| **Total Active Real Estate** | | | **$2,928,354,381** | **$4,341,174,592** | **$4,045,960,429** |

Cash flows as of September 30, 2022.

*Not funded as of September 30, 2022.

[1/]Commitments as of December 31, 2022.

[2/]Due to the nature of the investments, there are no capital commitments for value add/opportunistic SMA, legacy real assets, and real estate securities managers.

## Investment Summary - U.S. Equity

December 31, 2022 (unaudited)

### Objective

The objective of U.S. Equity is to generate returns through capital appreciation, income from dividend payments and to generate returns comparable to its public equity benchmark (90% Russell 1000 Index / 10% Russell 2000 Index) over 5-year periods (annualized, net of fees).

### Structure

U.S. Equity investments are traditional equity investments made in the form of separate accounts and commingled funds. U.S. Equity contributes to a higher expected long-term return to the fund and is also a material contributor to volatility.

### U.S. Equity

as of December 31, 2022

($ millions)

| Manager | Investment Style | Fair Value[1/] |
|---|---|---|
| **U.S. Large/Mid Cap** | | |
| Mellon Investments Corporation Russell 1000 | U.S. Large Cap Equity | $9,349.4 |
| **Total U.S. Large/Mid Cap** | | **9,349.4** |
| **U.S. Small Cap** | | |
| Emerald Asset Management | U.S. Small Cap Growth Equity | 335.1 |
| Mellon Investments Corporation Russell 2000 Core | U.S. Small Cap Equity | 407.2 |
| Mellon Investments Corporation Russell 2000 Value | U.S. Small Cap Value Equity | 321.6 |
| **Total U.S. Small Cap** | | **1,063.9** |
| **Total U.S. Equity** | | **$10,413.3** |

[1/]Includes securities and cash, which the manager had available for investment.

## Investment Summary - International Developed Markets Equity

**December 31, 2022 (unaudited)**

### Objective

The objective of International Developed Markets Equity is to generate returns through capital appreciation and income from dividend payments that meet or exceed the MSCI World ex U.S. Index over 5-year periods (annualized, net of fees).

### Structure

International Developed Markets Equity investments are traditional equity investments made in the form of separate accounts and commingled funds. International Developed Markets Equity contributes to a higher expected long-term return to the fund and is also a material contributor to volatility.

### International Developed Markets Equity

as of December 31, 2022

($ millions)

| Manager | Investment Style | Fair Value[1/] |
|---|---|---|
| Artisan Partners - Global ex U.S. | Global ex-U.S. growth | $0.6 |
| BlackRock MSCI World ex U.S. Index | World ex-U.S. Equity | 3,371.5 |
| Harris Associates | World ex-U.S. Small Cap Equity | 126.0 |
| Mellon Investments Corporation MSCI World ex U.S. Index | MSCI World ex-U.S. Index | 2.1 |
| Morgan Stanley Investment Management Limited-developed ex U.S. | EAFE value | 0.2 |
| Northern Trust - Equity | Transition | 1.1 |
| Templeton Investment Counsel - Global ex U.S. | Global ex-U.S. value | 0.7 |
| Walter Scott & Partners Limited | Global Equity | 662.9 |
| Xponance | International Small Cap Equity | 202.5 |
| **Total International Developed Markets Equity** | | **$4,367.6** |

[1/] Includes securities and cash, which the manager had available for investment.

## Investment Summary - Emerging Markets Equity

December 31, 2022 (unaudited)

### Objective

The objective of Emerging Markets Equity is to generate returns through capital appreciation and income from dividend payments that exceed the MSCI Emerging Markets Index over 5-year periods (annualized, net of fees).

### Structure

Emerging Markets Equity investments are traditional equity investments made in the form of commingled funds since there are legal challenges for SERS to use separate accounts to open sub-custodial trading accounts in certain emerging market countries. Emerging Markets Equity contributes to a higher expected long-term return to the fund and is also a material contributor to volatility.

Emerging markets are generally regarded as less efficient than developed markets and historically have been more volatile than developed markets. Returns have been influenced by capital flows into and out of these markets; however, longer term, emerging markets can be attractive to those investors seeking to access the financial returns derived from rapidly expanding economies. Due to the high return volatility associated with emerging markets, the SERS Fund takes a diversified approach using a variety of investment strategies. The SERS Fund employs a structure diversified by investment advisor, style, and type.

### Emerging Markets Equity

as of December 31, 2022

($ millions)

| Manager | Investment Style | Fair Value[1/] |
|---|---|---|
| BlackRock MSCI Emerging Markets Index | Emerging Markets Equity | $168.0 |
| GlobeFlex Capital | Emerging Markets Small Cap Equity | 121.4 |
| Leading Edge Investment Advisors | Emerging Markets Equity | 214.8 |
| Macquarie Emerging Markets | Emerging Markets Equity | 308.3 |
| Martin Currie Investment Management | Emerging Markets Equity | 336.3 |
| **Total Emerging Markets Equity** | | **$1,148.8** |

[1/]Includes securities and cash, which the manager had available for investment.

## Investment Summary - Fixed Income

**December 31, 2022 (unaudited)**

### Objective

The objective of the Fixed Income allocation is to provide liquidity to minimize capital impairment risk, diversify investment risk, and enhance return to meet the fund's obligations. It is expected that the returns from the Fixed Income allocation will meet or exceed its benchmark (Bloomberg U.S. Aggregate Bond Index) performance over 5-year periods (annualized, net of fees).

### Structure

Fixed Income investments are traditional investments made in the form of separate accounts and commingled funds. They include investments in publicly-traded debt obligations of sovereign, quasi-sovereign and corporate entities and securitized assets.

### Fixed Income

as of December 31, 2022

($ millions)

| Manager | Investment Style | Fair Value[1/] |
|---|---|---|
| **Core Fixed Income** | | |
| Mellon Investments Corporation Bond Index | U.S. Aggregate Bond | $3,858.9 |
| PIMCO Core | U.S. Aggregate Bond | 511.2 |
| **Total Core Fixed Income** | | **4,370.1** |
| **Nominal US Treasuries** | | |
| Mellon Investments Corporation Intermediate Treasury Bond Index | U.S. Intermediate Treasuries | 263.0 |
| Mellon Investments Corporation Long Duration Bond Index | U.S. Long Duration Treasuries | 485.2 |
| PIMCO U.S. Treasuries | U.S. Treasuries | 85.9 |
| **Total Nominal US Treasuries** | | **834.1** |
| **Opportunistic Fixed Income** | | |
| Blackstone Keystone | Fund-of-Funds | 854.6 |
| **Total Opportunistic Fixed Income** | | **854.6** |
| **Legacy Fixed Income** | | |
| Brandywine Global | Global Sovereign Credit | 0.1 |
| Fidelity Institutional Asset Management | Commercial Mortgage-Backed Securities | 245.2 |
| SEI Structured Credit Fund | High Yield Bank Loans | 0.5 |
| Stone Harbor HY | Global High Yield | 0.3 |
| **Total Legacy Fixed Income** | | **246.1** |
| **Total Fixed Income** | | **$6,304.9** |

[1/] Includes securities and cash, which the manager had available for investment.

## Investment Summary - Inflation Protection (TIPS)
December 31, 2022 (unaudited)

### Objective
The objective of Inflation Protection is to protect against both expected and unexpected higher inflation, provide liquidity to minimize capital impairment risk, reduce volatility of the total fund, and contribute total return to the fund that meet or exceed its benchmark (Bloomberg U.S. TIPS Index) over 5-year periods (annualized, net of fees).

### Structure
Treasury Inflation-Protected Securities (TIPS) are traditional investments made in the form of separate accounts and commingled funds. The primary advantage of TIPS is that their return offers protection against both expected and unexpected higher inflation, as the securities' coupon payments are directly tied to the rate of inflation. TIPS, therefore, maintain the purchasing power of the investor. The coupon payments of TIPS have two components: a real coupon rate that is established at the issuance of the bond, and an accrual equal to the rate of inflation which adds to the principal balance of the security. TIPS are also useful for hedging liabilities which are affected by inflation and for hedging a cash flow stream against the need to liquidate equities and conventional bonds at depressed prices, in order to meet pension obligations during periods of unexpected inflation.

### Inflation Protection (TIPS)
as of December 31, 2022

($ millions)

| Manager | Investment Style | Fair Value[1/] |
|---|---|---|
| Brown Brothers Harriman | U.S. TIPS | $459.9 |
| New Century Advisors | Global TIPS | 108.1 |
| NISA Investment Advisors | U.S. TIPS | 437.9 |
| **Total Inflation Protection (TIPS)** | | **$1,005.9** |

[1/]Includes securities and cash, which the manager had available for investment.

## Investment Summary - Cash

**December 31, 2022 (unaudited)**

### Objective

The objective of Cash is to serve as the primary source of liquidity and generate returns that meet or exceed its benchmark (ICE BofAML U.S. 3-Month Treasury Bill Index) over a three-year period.

### Structure

Cash investments emphasize the use of higher credit quality debt instruments that are liquid and have short maturities and durations, or have floating rates and have historically been invested in the Pennsylvania Treasury Group Investment Fund, a short-term investment fund.

**Cash**

as of December 31, 2022

($ millions)

| Manager | Investment Style | Fair Value[1/] |
|---|---|---|
| PA State Treasury (STIF) | Cash | $575.5 |
| **Total Cash** | | **$575.5** |

[1/]Includes securities and cash, which the manager had available for investment.

## Investment Summary - Legacy Private Credit

December 31, 2022 (unaudited)

### Objective

SERS will continue to work with existing Legacy Private Credit managers to actively achieve a return in excess of the S&P/LSTA Leveraged Loan Index plus 100 basis points for the duration of the investments.

### Structure

Private Credit investments are non-traditional investments made in the form of closed-end limited partnership structures. The current structure of this portfolio consists of legacy investments that will continue to decrease over time as investments are realized, liquidated, and redeemed.

### Status

SERS no longer has an asset allocation targeting this strategy as a stand-alone asset class.

### Legacy Private Credit

as of December 31, 2022

($ millions)

| Sub-Asset Class | Unfunded Commitments | Fair Value | % of Total Fund |
|---|---|---|---|
| Legacy Private Credit | $174.4 | $394.0 | 1.2% |

The Capital Committed column represents total dollars allocated from SERS to each limited partnership. Accumulated Capital Drawn is the portion of SERS' capital commitments drawn by the general partner to be invested with underlying portfolio companies along with any reinvested capital. The Accumulated Distributions column shows the value of capital and profits returned to SERS.

### Legacy Private Credit Committed, Drawn, and Distributed

| Active Legacy Private Credit Funds | Strategy/ Stage | SERS Initial Funding | Capital Committed[1/] | Accumulated Capital Drawn | Accumulated Distributions[2/] |
|---|---|---|---|---|---|
| Apollo Hybrid Value Fund | Diversified Credit | 12/24/2018 | $100,000,000 | $130,370,471 | $82,506,269 |
| Ares PA Opportunities Fund - Direct Lending | Direct Lending | 10/12/2021 | 100,000,000 | 62,801,102 | 0 |
| Audax Direct Lending Solutions Fund-A | Direct Lending | 10/26/2018 | 100,000,000 | 91,068,458 | 49,376,700 |
| Brightwood Capital Fund IV | Direct Lending | 4/24/2018 | 100,000,000 | 100,000,000 | 36,851,306 |
| ICG North American Private Debt Fund II | Direct Lending | 2/27/2019 | 50,000,000 | 35,200,737 | 11,863,206 |
| Permira Credit Solutions IV Master (Feeder) SCSp | Direct Lending | 9/26/2019 | 75,000,000 | 54,466,899 | 11,510,367 |
| Permira Susquehanna Opportunities - Credit | Direct Lending | 4/7/2021 | 60,000,000 | 12,287,712 | 539,209 |
| **Total Active Legacy Private Credit Funds** | | | **$585,000,000** | **$486,195,379** | **$192,647,057** |

Cash flows as of September 30, 2022.

[1/]Commitments as of December 31, 2022.

[2/]Distributions include stock distributions. Distributions may include fees that are recorded as negative distributions to be offset against future distributions of the underlying limited partnership investment.

## Investment Summary - Legacy Hedge Funds

**December 31, 2022 (unaudited)**

### Objective

SERS will continue to work with existing legacy managers as well as explore options to work with strategic partners to expedite the redemption process in a thoughtful and cost-effective way.

### Structure

The current structure of this portfolio consists of legacy investments that will continue to decrease over time as investments are realized, liquidated, and redeemed.

### Status

SERS is no longer actively investing in this strategy; legacy hedge fund portfolios are currently in liquidation. The remaining balance has continued to decrease as SERS has successfully redeemed assets from legacy managers.

### Legacy Hedge Funds

as of December 31, 2022

($ millions)

| Manager | Investment Style | Fair Value[1/] |
|---|---|---|
| Legacy Hedge Funds | Fund-of-Funds | $15.3 |
| Luxor Capital Partners | Direct Hedge Fund | 1.9 |
| **Total Legacy Hedge Funds** | | **$17.2** |

[1/]Includes securities and cash, which the manager had available for investment.

## Defined Contribution Plan Investment Options

December 31, 2022 (unaudited)

### Investment Policy

The SERS Board originally adopted the 401(a) Defined Contribution Plan (Defined Contribution Plan) Investment Policy Statement (DC IPS) on June 13, 2018, and most recently amended the policy on May 5, 2022.

The purpose of the DC IPS is to formalize the board's investment objectives and policies, and to define the duties and responsibilities of the various individuals and entities involved in the investment process.

The purpose of the Defined Contribution Plan is to provide eligible employees (employees) with a source of retirement income from accumulated employee contributions, employer contributions, and investment returns. The objective of the Defined Contribution Plan is to allow employees to defer a portion of their salary into the plan, promote and maximize capital accumulation, and enable employees to meet their personal retirement investment goals. It is the board's intent to make available an array of low-cost investment options that satisfy the following criteria:

- Each investment option is diversified within itself
- Each investment option has different risk and return and/or style characteristics; and
- Each investment option, in combination with the other available investment options, contributes to the diversification opportunities of a participant's portfolio

The board has delegated certain responsibilities related to the effective management of the Defined Contribution Plan. Various responsibilities are allocated among the board, agency staff, investment managers, investment consultant, custodian/sub-custodian, and the third-party administrator. All persons who act as agents of the board are expected to adhere to the highest standards of professional integrity and honesty. The responsibilities of the Defined Contribution Plan's service providers are governed by the applicable service agreements, as well as the DC IPS.

The board employs an investment staff and investment consultant, which are responsible to the board to review and analyze the current investment climate, and to recommend adjustments with respect to the policy that are appropriate to take optimum advantage of new conditions and strategies as they arise in the market place.

### Investment Options

It is the board's intent to offer a broad range of investment options with materially different risk and return characteristics to allow participants, by choosing among such investment options, the opportunity to diversify their balances and construct portfolios consistent with their unique circumstances, goals, time horizons, and tolerance for risk. It is the objective of the board to offer investment options at a reasonable cost in terms of management, custody, other costs, and have investment characteristics that can be successfully communicated to participants. Further, it is the intent of the board to designate names for the investment options that are easily understood by participants. The Defined Contribution Plan is required to offer a minimum of ten investment options that are professionally managed by at least three investment managers. The board offers three tiers of investment options to meet various participant investment objectives. Described below are the various types of investment options. The board selects available investment options and investment managers and adds or removes such options or investment managers at any time in its discretion. The screening process for the initial selection of any investment option or manager will consider attributes relevant to the specific asset class and search objective, as developed by the board with the assistance of SERS-Investment Office staff and in consultation with its external investment consultant, where applicable.

### Target Date Fund Investment Options

Target date funds provide a series of asset allocation funds that allow participants to choose a single fund that is based on their expected target retirement date. Each target date fund includes a professionally managed portfolio of underlying investments that may include fixed income, equity

## Defined Contribution Plan Investment Options

**December 31, 2022 (unaudited)**

and alternative asset classes. BlackRock, the investment manager, adjusts and rebalances the allocation of assets over time to reduce the expected risk as each fund progresses toward its target date. The board recognizes that some participants may fail to make investment choices for their plan account. Therefore, the board believes it is appropriate to designate a target date fund based on the participant's age as the default investment option for any participant who fails to make an investment choice for his or her contributions.

### Asset Class Investment Options

Additional investment options that match participants' unique investment goals, investor profile, and risk tolerance are also available. The additional investment options provide a broad exposure to major asset classes including stocks, bonds, and capital preservation investments. The Short-Term Investment Fund is managed by the Commonwealth of Pennsylvania Treasury Department. The other funds are managed by Mellon Investments Corporation.

### Self-Directed Brokerage Option

The self-directed brokerage option provides access to a brokerage window for participants who seek greater investment flexibility. This investment option is offered through the Charles Schwab Corporation. Participants investing in this option do so at their own risk. The board is not responsible for the monitoring or evaluation of any self-directed brokerage account investments.

## Defined Contribution Plan Investment Options, Returns, and Expenses

Participation, Assets, Performance, and Fund Expense

as of December 31, 2022

| Fund Name | Participants | Fund Balance | Inception Date | Estimated Calendar Year, Net-of-Fees Returns1/ | | | | Max Total Investment Fund Expense2/ |
|---|---|---|---|---|---|---|---|---|
| | | | | 1 Year | 3 Year | 5 Year | 10 Year | |
| Post Retirement Date Fund | 515 | $1,469,918 | 08-2005 | (14.63%) | 0.74% | 2.68% | 4.02% | 0.0775% |
| 2025 Retirement Date Fund | 1,052 | 3,972,636 | 07-2006 | (15.23) | 1.20 | 3.18 | 5.29 | 0.0775 |
| 2030 Retirement Date Fund | 1,853 | 9,261,669 | 08-2005 | (15.97) | 1.87 | 3.78 | 5.99 | 0.0775 |
| 2035 Retirement Date Fund | 2,305 | 9,243,344 | 07-2006 | (16.67) | 2.50 | 4.35 | 6.66 | 0.0775 |
| 2040 Retirement Date Fund | 2,356 | 10,552,325 | 08-2005 | (17.35) | 3.04 | 4.83 | 7.22 | 0.0775 |
| 2045 Retirement Date Fund | 2,483 | 10,841,016 | 07-2006 | (17.89) | 3.53 | 5.21 | 7.68 | 0.0775 |
| 2050 Retirement Date Fund | 2,722 | 11,702,247 | 09-2007 | (18.20) | 3.79 | 5.40 | 7.94 | 0.0775 |
| 2055 Retirement Date Fund | 3,107 | 11,918,863 | 05-2010 | (18.27) | 3.85 | 5.44 | 8.06 | 0.0775 |
| 2060 Retirement Date Fund | 3,651 | 11,291,321 | 11-2014 | (18.28) | 3.84 | 5.43 | NA | 0.0775 |
| 2065 Retirement Date Fund | 4,425 | 8,236,654 | 09-2019 | (18.30) | 3.77 | NA | NA | 0.0775 |
| U.S. Large Company Stock Index Fund | 999 | 4,081,906 | 12-1994 | (18.12) | 7.67 | 9.43 | 12.57 | 0.0150 |
| U.S. Small/Mid Company Stock Index Fund | 251 | 766,890 | 08-1998 | (26.13) | 3.26 | 5.06 | 9.74 | 0.0250 |
| U.S. All Company Stock Index Fund | 738 | 1,465,625 | 01-2011 | (19.23) | 7.13 | 8.73 | 12.11 | 0.0250 |
| Global Non-U.S. Stock Index Fund | 754 | 2,165,623 | 03-2009 | (15.92) | 0.30 | 1.14 | 3.95 | 0.0450 |
| U.S. Bond Index Fund | 678 | 1,069,413 | 02-1995 | (12.94) | (2.71) | 0.02 | 1.02 | 0.0200 |
| U.S. Short-Term Bond Index Fund | 299 | 130,477 | 12-2017 | (3.69) | (0.32) | 0.91 | NA | 0.0200 |
| U.S. Treasury Inflation Protected Security Index Fund3/ | 440 | 335,887 | 07-2007 | (11.76) | 1.22 | 2.11 | NA | 0.0200 |
| Short-Term Investment Fund4/ | 136 | 4,592,993 | 10-1988 | 1.59 | 0.77 | 1.34 | 0.89 | 0.0000 |
| Charles Schwab Self-Directed Brokerage5/ | 34 | 156,694 | NA | NA | NA | NA | NA | NA |

1/Performance is calculated using time-weighted rate of return.

2/Maximum possible expense that can be charged.

3/There was a break in the return history of the TIPS fund between 2010 and 2017, since there were no participants during that time.

4/Short-Term Investment Fund balance includes $3.8 million in unvested employer contributions forfeited to the Plan.

5/For those in the Self-Directed Brokerage Option (SDB), the asset fee is assessed against the balance in the SDB but the actual deduction is prorated against the core investment options separately.

The Plan's monthly recordkeeping fee is $4.55 per participant and is paid by plan employers in the form of an annual per participant charge.

# Actuarial Section

pennsylvania
STATE EMPLOYEES' RETIREMENT SYSTEM
100 YEARS OF SERVICE
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June 6, 2023

Mr. Joseph A. Torta
Executive Director
State Employees' Retirement System
30 North Third Street - Suite 150
Harrisburg, PA 17101-1716

Dear Mr. Torta:

The purpose of this letter is to certify the actuarial adequacy of the contributions being made by the Commonwealth of Pennsylvania and other participating agencies to the Pennsylvania State Employees' Retirement System (SERS), and to discuss the approach currently being taken toward meeting the financing objectives of the plan. The results provided herein are based upon the December 31, 2022 annual actuarial valuation for funding purposes.

The funding objective of the plan is set forth in the State Employees' Retirement Code (SERC). The annual employer contribution is equal to the sum of the following for the commonwealth fiscal year beginning July 1, 2023:

(1) The employer share of the normal cost.
(2) The fresh start amortization of the December 31, 2009 unfunded liability over a 30-year period beginning July 1, 2010 and ending on June 30, 2040.
(3) The amortization of the change in liability due to Act 2010-120 (Act 120) over a 30-year period beginning July 1, 2011 and ending on June 30, 2041.
(4) The amortization of changes in liability due to actual experience differing from assumed experience after December 31, 2009 over 30-year periods beginning with the July following the actuarial funding valuation determining such changes.
(5) The extra contribution to return Act 2017-5 savings.
(6) The amortization of legislated benefit changes, including cost-of-living increases, over 10-year periods beginning with the July following the actuarial funding valuation determining such changes. (Note: There are currently no 10-year amortizations being funded.)

The amortization payments are level dollar amounts over the remaining applicable amortization periods. The employer cost is determined as a percent of retirement covered compensation. The total employer cost is the average contribution amount that needs to be received from the employer groups participating in the system. Some employer groups contribute a higher percent of compensation and others contribute a lower percent of compensation, depending on the benefits payable to each group's employees.

Mr. Joseph A. Torta
June 6, 2023

The actuarial funding valuation is based on financial and participant data, which is prepared by SERS staff. We rely on that data and ensure that it is reviewed for internal and year-to-year consistency as well as general reasonableness prior to being used in the actuarial funding valuation.

The actuarial valuation uses various economic and demographic assumptions regarding future plan experience. These assumptions were adopted by the State Employees' Retirement Board (the Board) in July of 2020 based upon the recommendations included in our July 2020 report on the nineteenth investigation of actuarial experience of SERS, covering the years 2015 through 2019. These changes to both the economic and demographic assumptions, were implemented with the December 31, 2020 actuarial valuation. To ensure that the investment return assumption remains up-to-date and appropriate for every actuarial valuation, it is reviewed annually by the SERS actuaries and Board. The Board reduced the annual investment return assumption to 6.875% and maintained the inflation assumption at 2.50% during its 2022 review. We will continue to closely monitor the investment return assumption and will recommend changing it if conditions warrant such change. The actuarial value of assets is developed by recognizing the difference between the expected actuarial value of assets and the market value of assets over a five-year period.

Governmental Accounting Standards Board (GASB) Statement No. 67, *Financial Reporting for Pension Plans,* replaced the requirements of GASB Statement No. 25, *Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans,* effective for financial statements for fiscal years ending on or after June 30, 2014. GASB Statement No. 68, *Accounting and Financial Reporting for Pensions,* replaced the requirements of GASB Statement No. 27, *Accounting for Pensions by State and Local Governmental Employers,* effective for fiscal years ending on or after June 30, 2015. GASB 67 is designed for financial reporting by pension plans and GASB 68 is designed for financial reporting by entities that participate in pension plans. The objective of both statements is to provide more useful, transparent, and comparable financial information related to pensions. The Financial Section now includes new schedules in response to the reporting requirements of GASB Statement No. 67. Although two schedules that were required disclosures under Statement No. 25 were discontinued, namely the "Schedule of Funding Progress" and the "Schedule of Employer Contributions," these schedules remain of interest and, therefore, have been updated to reflect the December 31, 2022 actuarial funding valuation and are included herein.

GASB Statement No. 25, although it has been replaced by GASB Statement No. 67, established the Annual Required Contribution (ARC), which was recognized for many years as the minimum annual contribution required by GASB. How a pension plan's actual contributions compare to the ARC is likely to remain of interest despite the fact that GASB has discontinued the ARC. For SERS, the scheduled contributions from July 1, 2005 through June 30, 2015 were below the minimum amount required to meet the GASB No. 25 minimum. Originally this was a result of financing changes implemented by Act 2003-40 in December 2003. Later, this became a consequence of the contribution collars required under Act 2010-120. After June 30, 2015, because employer contributions are being made in accordance with current law, they are exceeding the GASB No. 25 minimum.

The following schedules were prepared by us, Korn Ferry, from the December 31, 2022 actuarial funding valuation: "Schedules of Active Member Valuation Data", "Solvency Test", "Analysis of Financial Experience", "Schedule of Funding Progress", "Schedule of Contributions Under Previous Reporting Standards", and "History and Projection of Contribution Rates and Funded Ratios".

Based upon the valuation results, it is our opinion that, provided future employer contributions are made in accordance with current law, the Pennsylvania State Employees' Retirement System is, and will continue to be, adequately funded, in accordance with generally accepted actuarial principles and procedures.

It should be noted that, during June of 2017, Governor Tom Wolf signed into law Act 2017-5. Act 2017-5 fundamentally changed retirement options for most new hires beginning January 1, 2019. This legislation introduced two new hybrid defined benefit (DB)/defined contribution (DC) options and a straight DC option. New classes of service now apply to most State employees who first become SERS members on or after January 1, 2019; however, most hazardous duty employees are exempt from the new plan design.

In April 2020, SERS received an advance payment of $1,061 million from the Pennsylvania State University (PSU), and in April 2021, SERS received an advance payment of $825 million from the Pennsylvania State System of Higher Education (PASSHE). The advance payments were part of a funding agreement under Act 2019-105 that reduced PSU's and PASSHE's allocated shares of the unfunded liability and created schedules of setoff amounts that reduce the future contributions due from each. These arrangements accelerated the funding of SERS but are not expected to increase the long-term funded status of SERS since the future contributions from PSU and PASSHE will be reduced by the value of the advance payments.

Mr. Joseph A. Torta
June 6, 2023

To ensure the expected benefit of the advance payments is allocated to PSU and PASSHE, the value of the future setoff amounts is added to the unfunded liability to determine the Amortization Liability. The Amortization Liability is used to determine the amortization payments due from all employers, prior to recognizing any setoff amounts. This allows the effect of the advance payments to be allocated only to PSU and PASSHE and have no expected effect on the contributions due from the other employers.

**Actuarial Certification**

To the best of our knowledge, this report is complete and accurate and all costs and liabilities have been determined on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan. The report, costs, liabilities, assumptions, and methods used for funding purposes are in accordance with the parameters set by Actuarial Standards of Practice.

The actuaries certifying to this valuation are members of the Society of Actuaries or other professional actuarial organizations and meet the Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Respectfully submitted,
Korn Ferry

By ______________________
Craig R. Graby
Member American Academy of Actuaries
Enrolled Actuary No. 23-7319

By ______________________
Kristopher E. Seets, F.S.A.
Member American Academy of Actuaries
Enrolled Actuary No. 23-8055

## Summary of Actuarial Assumptions and Methods

December 31, 2022 (unaudited)

The Actuarial Section of SERS' Annual Comprehensive Financial Report presents information on the Defined Benefit Plan, unless noted otherwise. The schedules in this section are reported in accordance with SERS' actuarial funding valuation based on statutory requirements. For funding purposes, actuarial methods are specified by statute while actuarial assumptions are recommended by SERS' actuary and approved by the SERS Board, as trustees of the State Employees' Retirement Fund. The State Employees' Retirement Code (retirement code), legislated by the General Assembly and signed into law by the Governor, establishes funding policy. The retirement code is administered by the SERS Board. The General Assembly, along with the Governor's signing, has the authority to amend the retirement code. The Financial Section, except where noted, is reported in accordance with a separate actuarial accounting valuation based on Governmental Accounting Standards Board (GASB) Statement No. 67.

For funding purposes, a five-year smoothed market value is used as the asset valuation method compared to fair (market) value for financial reporting purposes under GASB 67. As of December 31, 2021, the traditional entry-age cost method was used for both the funding valuation and the accounting valuation. This method calculates employer normal costs based on a blend of all active members in the system in that year. For the December 31, 2020 funding valuation and prior, a statutorily required modified entry-age funding method was used. That method calculated employer normal costs based upon the cost of new hires only.

SERS uses amortization periods of 10 years and 30 years with level payments over closed periods. The current amortization schedules are as follows:

(1) Act 2010-120 established a fresh start amortization of the December 31, 2009 unfunded liability over a 30-year period beginning July 1, 2010, and ending June 30, 2040.

(2) The amortization of the change in liability due to Act 2010-120 over a 30-year period beginning July 1, 2011, and ending on June 30, 2041.

(3) The amortization of changes in liability due to actual experience differing from assumed experience and from changes in assumptions after December 31, 2009, over 30-year periods beginning with the July 1 following the actuarial valuation determining such changes.

Actuarial methods and assumptions used for both funding purposes as well as financial reporting purposes include:

- The investment rate of return of 6.875% per year is based on an underlying rate of inflation of 2.5% per year.
- For current and future male non-disabled retirees, beneficiaries, and survivors, SERS uses the PubG-2010 Male Retiree Mortality Table, with post-2010 mortality improvement based on Scale MP-2019 for Males. For current and future female non-disabled retirees, beneficiaries, and survivors, SERS uses the PubG-2010 Female Retiree Mortality Table, set forward one year, with post-2010 mortality improvement based on Scale MP-2019 for Females. For current and future male disabled retirees, SERS uses the PubNS-2010 Male Disabled Retiree Mortality Table, set forward two years, with post-2010 mortality improvement based on Scale MP-2019 for Males. For current and future female disabled retirees, SERS uses the PubNS-2010 Female Disabled Retiree Mortality Table, set forward two years, with post-2010 mortality improvement based on Scale MP-2019 for Females. For all pre-retirement active members, the mortality is determined by SERS' actuaries using actual SERS experience.

## Summary of Actuarial Assumptions and Methods

**December 31, 2022 (unaudited)**

- The rates for probability of retirement and the probabilities of withdrawal from active service, including death, before age and service retirements, which are presented in the **Schedules of Active Member Valuation Data**.
- The projected average salary increases of 4.55% with a range of 3.30% to 6.95%. This increase includes an underlying assumption of 2.5% for inflation. The general salary increase and annual rate of salary increase for promotions and longevity is presented in the **Schedules of Active Member Valuation Data**.
- No cost-of-living adjustments were used in the determination of actuarial valuations.

Every five years, SERS is required to conduct an actuarial experience study to determine whether the assumptions used in its annual actuarial valuations remain accurate based on current and anticipated demographic trends and economic conditions.

The *19th Investigation of Actuarial Experience* study for the period 2015 – 2019 was released and approved by the SERS Board in July 2020. The changes in assumptions were effective with the December 31, 2020, valuation.

The most recent valuations were based on members of SERS as of December 31, 2022. All census and asset data was supplied by SERS and was subject to reasonable consistency checks. The actuarial computations were prepared by, or under the supervision of, a Member of the American Academy of Actuaries (M.A.A.A.).

## Schedules of Active Member Valuation Data

December 31, 2022 (unaudited)

### Withdrawal From Active Employment Before Age and Service Retirement[1/]

Annual Rate of Active Members Separating Within the Next Year

| Sample Age | Male | | | | | | Female | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Withdrawal Years of Service | | | | Death | Disability | Withdrawal Years of Service | | | | Death | Disability |
| | 0 | 5 | 9 | 14+ | | | 0 | 5 | 9 | 14+ | | |
| 20 | 30.00% | NA | NA | NA | 0.06% | NA | 40.00% | NA | NA | NA | 0.03% | NA |
| 25 | 21.00 | 6.10% | 3.00% | NA | 0.06 | 0.01% | 24.80 | 8.50% | 2.40% | NA | 0.03 | 0.02% |
| 30 | 18.50 | 6.10 | 3.00 | 1.90% | 0.07 | 0.03 | 21.30 | 7.70 | 2.30 | 2.90% | 0.03 | 0.05 |
| 35 | 18.50 | 4.90 | 1.60 | 1.90 | 0.08 | 0.06 | 16.60 | 4.50 | 2.40 | 2.10 | 0.04 | 0.08 |
| 40 | 18.20 | 3.40 | 2.80 | 1.90 | 0.11 | 0.09 | 14.80 | 4.50 | 2.30 | 1.60 | 0.05 | 0.16 |
| 45 | 17.40 | 3.40 | 1.60 | 0.60 | 0.14 | 0.20 | 17.80 | 4.30 | 1.10 | 1.60 | 0.08 | 0.26 |
| 50 | 19.10 | 3.10 | 1.60 | 0.60 | 0.20 | 0.33 | 15.80 | 4.30 | 1.80 | 1.60 | 0.11 | 0.40 |
| 55 | 19.10 | 2.60 | 0.80 | 0.40 | 0.25 | 0.44 | 15.80 | 4.00 | 1.30 | 1.00 | 0.12 | 0.50 |
| 60 | NA | NA | NA | NA | 0.29 | NA | NA | NA | NA | NA | 0.19 | NA |

### Annual Rate of Retirement with Full Benefits (Superannuation)[1/]

**Class A-3 and A-4**

| Sample Age | Rate |
|---|---|
| 55 | 15.0% |
| 56 | 16.0 |
| 57 | 17.0 |
| 58 | 18.0 |
| 59 | 19.0 |
| 60 | 20.0 |
| 61 | 20.0 |
| 62 | 25.0 |
| 63 | 20.0 |
| 64 | 20.0 |
| 65 | 25.0 |
| 66-79 | 20.0 |
| 80 | 100.0 |

**Class A-5 and A-6**

| Sample Age | Rate |
|---|---|
| 55 | 15.0% |
| 56 | 16.0 |
| 57 | 17.0 |
| 58 | 18.0 |
| 59 | 19.0 |
| 60 | 20.0 |
| 61 | 20.0 |
| 62 | 25.0 |
| 63 | 20.0 |
| 64 | 20.0 |
| 65 | 25.0 |
| 66-79 | 20.0 |
| 80 | 100.0 |

**All Other Membership Classes**

| Sample Age | Rate | |
|---|---|---|
| | Male | Female |
| 53-54 | 15.0% | 23.0% |
| 55-57 | 20.0 | 23.0 |
| 58 | 25.0 | 23.0 |
| 59 | 25.0 | 28.0 |
| 60 | 20.0 | 23.0 |
| 61-64 | 20.0 | 20.0 |
| 65-67 | 26.0 | 26.0 |
| 68-70 | 23.0 | 23.0 |
| 71-79 | 20.0 | 20.0 |
| 80 | 100.0 | 100.0 |

[1/]The assumptions presented in the above tables were based on a review of SERS experience from 2015 - 2019. The rates are the probabilities that an event will occur in the year after the valuation. For instance, the male retirement rate of 20% at age 60 means that 200 of every 1,000 male employees age 60 and eligible for full benefits are expected to retire before they reach age 61.

## Schedules of Active Member Valuation Data

December 31, 2022 (unaudited)

### Annual Rate of Salary Increase[1/]

| Completed Years of Service | Career Salary Increase | Completed Years of Service | Career Salary Increase |
|---|---|---|---|
| 1 | 4.15% | 16 | 1.25% |
| 2 | 3.25 | 17 | 1.20 |
| 3 | 2.90 | 18 | 1.15 |
| 4 | 2.70 | 19 | 1.15 |
| 5 | 2.50 | 20 | 1.10 |
| 6 | 2.35 | 21 | 1.00 |
| 7 | 2.15 | 22 | 0.95 |
| 8 | 2.10 | 23 | 0.90 |
| 9 | 2.00 | 24 | 0.85 |
| 10 | 1.60 | 25 | 0.80 |
| 11 | 1.55 | 26 | 0.70 |
| 12 | 1.45 | 27 | 0.60 |
| 13 | 1.40 | 28 | 0.50 |
| 14 | 1.35 | 29 | 0.50 |
| 15 | 1.30 | 30+ | 0.50 |

[1/]In addition, it is assumed that salaries will increase by 2.8% per year, which includes inflation. The table above does not include that general salary increase. It is assumed that only the general salary increase is applicable to classes D and E.

### Reduced Benefits

| Class A-3 and A-4 | | Class A-5 and A-6 | |
|---|---|---|---|
| 10 or More Years of Service | | | |
| Sample Age | Rate | Sample Age | Rate |
| 35 | 1.50% | 35 | 1.50% |
| 40 | 1.50 | 40 | 1.50 |
| 45 | 1.50 | 45 | 1.50 |
| 50 | 2.00 | 50 | 2.00 |
| 55 | 5.50 | 55 | 5.50 |
| 60 | 5.50 | 60 | 5.50 |
| 61 | 6.00 | 61 | 6.00 |
| 62 | 20.00 | 62 | 8.00 |
| 63 | 10.00 | 63 | 10.00 |
| 64 | 15.00 | 64 | 10.00 |
| 65 | NA | 65 | 15.00 |
| | | 66 | 20.00 |
| | | 67 | NA |

| All Other Membership Classes | | | | |
|---|---|---|---|---|
| | 5 - 14 Years of Service | | 15 or More Years of Service | |
| Sample Age | Male | Female | Male | Female |
| 25 | 2.20% | 4.00% | NA | NA |
| 30 | 2.20 | 2.00 | NA | NA |
| 35 | 1.30 | 2.00 | 0.80% | 1.40% |
| 40 | 1.00 | 1.40 | 0.60 | 1.30 |
| 45 | 1.00 | 1.40 | 0.60 | 1.30 |
| 50 | 1.00 | 1.40 | 1.10 | 1.60 |
| 55 | 2.00 | 2.30 | 5.00 | 4.50 |

## Schedules of Active Member Valuation Data

December 31, 2022 (unaudited)

### Active Members by Age and Years of Service - Male

| Age Group | Years of Service: 0 - 4 | 5 - 9 | 10 - 14 | 15 - 19 | 20 - 24 | 25 - 29 | 30+ | Total | Average Salary |
|---|---|---|---|---|---|---|---|---|---|
| < 20 | 54 | NA | NA | NA | NA | NA | NA | 54 | $35,169 |
| 20 - 24 | 1,256 | 12 | NA | NA | NA | NA | NA | 1,268 | 42,325 |
| 25 - 29 | 3,013 | 757 | 2 | NA | NA | NA | NA | 3,772 | 54,997 |
| 30 - 34 | 2,553 | 2,649 | 479 | 12 | NA | NA | NA | 5,693 | 63,685 |
| 35 - 39 | 1,893 | 2,223 | 1,988 | 699 | 17 | NA | NA | 6,820 | 70,438 |
| 40 - 44 | 1,527 | 1,479 | 1,543 | 2,081 | 555 | 13 | NA | 7,198 | 75,177 |
| 45 - 49 | 1,242 | 1,121 | 1,164 | 1,556 | 1,532 | 443 | 4 | 7,062 | 78,647 |
| 50 - 54 | 1,257 | 1,084 | 1,079 | 1,424 | 1,470 | 1,191 | 445 | 7,950 | 80,374 |
| 55 - 59 | 1,097 | 921 | 949 | 1,134 | 1,121 | 816 | 997 | 7,035 | 77,121 |
| 60 - 64 | 814 | 752 | 770 | 912 | 581 | 340 | 522 | 4,691 | 72,466 |
| 65+ | 605 | 512 | 495 | 579 | 310 | 163 | 294 | 2,958 | 76,910 |
| **Total** | **15,311** | **11,510** | **8,469** | **8,397** | **5,586** | **2,966** | **2,262** | **54,501** | **$72,502** |

**Average Age: 46.04**

**Average Service: 11.50**

### Active Members by Age and Years of Service - Female

| Age Group | Years of Service: 0 - 4 | 5 - 9 | 10 - 14 | 15 - 19 | 20 - 24 | 25 - 29 | 30+ | Total | Average Salary |
|---|---|---|---|---|---|---|---|---|---|
| < 20 | 33 | NA | NA | NA | NA | NA | NA | 33 | $32,110 |
| 20 - 24 | 717 | 5 | NA | NA | NA | NA | NA | 722 | 38,780 |
| 25 - 29 | 1,873 | 425 | 4 | NA | NA | NA | NA | 2,302 | 47,507 |
| 30 - 34 | 1,920 | 1,553 | 303 | 13 | NA | NA | NA | 3,789 | 53,586 |
| 35 - 39 | 1,791 | 1,438 | 1,060 | 414 | 13 | NA | NA | 4,716 | 58,494 |
| 40 - 44 | 1,670 | 1,338 | 992 | 1,246 | 420 | 18 | NA | 5,684 | 63,019 |
| 45 - 49 | 1,473 | 1,082 | 898 | 1,074 | 880 | 264 | 27 | 5,698 | 65,535 |
| 50 - 54 | 1,338 | 1,126 | 885 | 1,105 | 938 | 629 | 457 | 6,478 | 66,740 |
| 55 - 59 | 1,083 | 969 | 901 | 1,057 | 838 | 515 | 705 | 6,068 | 65,584 |
| 60 - 64 | 687 | 769 | 757 | 877 | 540 | 270 | 381 | 4,281 | 65,009 |
| 65+ | 297 | 414 | 387 | 450 | 248 | 125 | 202 | 2,123 | 65,308 |
| **Total** | **12,882** | **9,119** | **6,187** | **6,236** | **3,877** | **1,821** | **1,772** | **41,894** | **$61,970** |

**Average Age: 47.15**

**Average Service: 10.89**

## Schedules of Active Member Valuation Data

December 31, 2022 (unaudited)

### Aggregate Active Member Valuation Data

| Valuation Year Ended Dec 31 | Number of Employers | Number of Active Members | Covered-Employee Payroll | Annual Average Pay | % Increase/(Decrease) In Average Pay |
|---|---|---|---|---|---|
| 2022 | 101[1/] | 96,395 | $6,547,630,000 | $67,925 | 4.1% |
| 2021 | 101[1/] | 97,857 | 6,383,604,000 | 65,234 | 2.2 |
| 2020 | 102[2/] | 100,962 | 6,441,578,000 | 63,802 | 3.7 |
| 2019 | 102[2/] | 102,850 | 6,328,566,000 | 61,532 | 2.6 |
| 2018 | 102[2/] | 103,007 | 6,178,000,000 | 59,984 | 3.2 |
| 2017 | 102[2/] | 102,978 | 5,984,000,000 | 58,113 | 2.9 |
| 2016 | 103[3/] | 104,632 | 5,912,000,000 | 56,499 | (0.6) |
| 2015 | 104[4/] | 105,025 | 5,972,000,000 | 56,858 | 3.8 |
| 2014 | 104[4/] | 104,431 | 5,720,000,000 | 54,769 | 2.9 |
| 2013 | 104 | 105,186 | 5,598,000,000 | 53,224 | 1.9 |

[1/]The membership includes 38 employers and the commonwealth is classified as its largest employer. The commonwealth comprises 64 agencies and when everything is evaluated separately, the Defined Benefit Plan has a total of 101 participating employers/agencies.

[2/]The membership includes 38 employers and the commonwealth is classified as its largest employer. The commonwealth comprises 65 agencies and when everything is evaluated separately, the Defined Benefit Plan has a total of 102 participating employers/agencies.

[3/]The membership includes 38 employers and the commonwealth is classified as its largest employer. The commonwealth comprises 66 agencies and when everything is evaluated separately, the Defined Benefit Plan has a total of 103 participating employers/agencies.

[4/]The membership includes 39 employers and the commonwealth is classified as its largest employer. The commonwealth comprises 66 agencies and when everything is evaluated separately, the Defined Benefit Plan has a total of 104 participating employers/agencies.

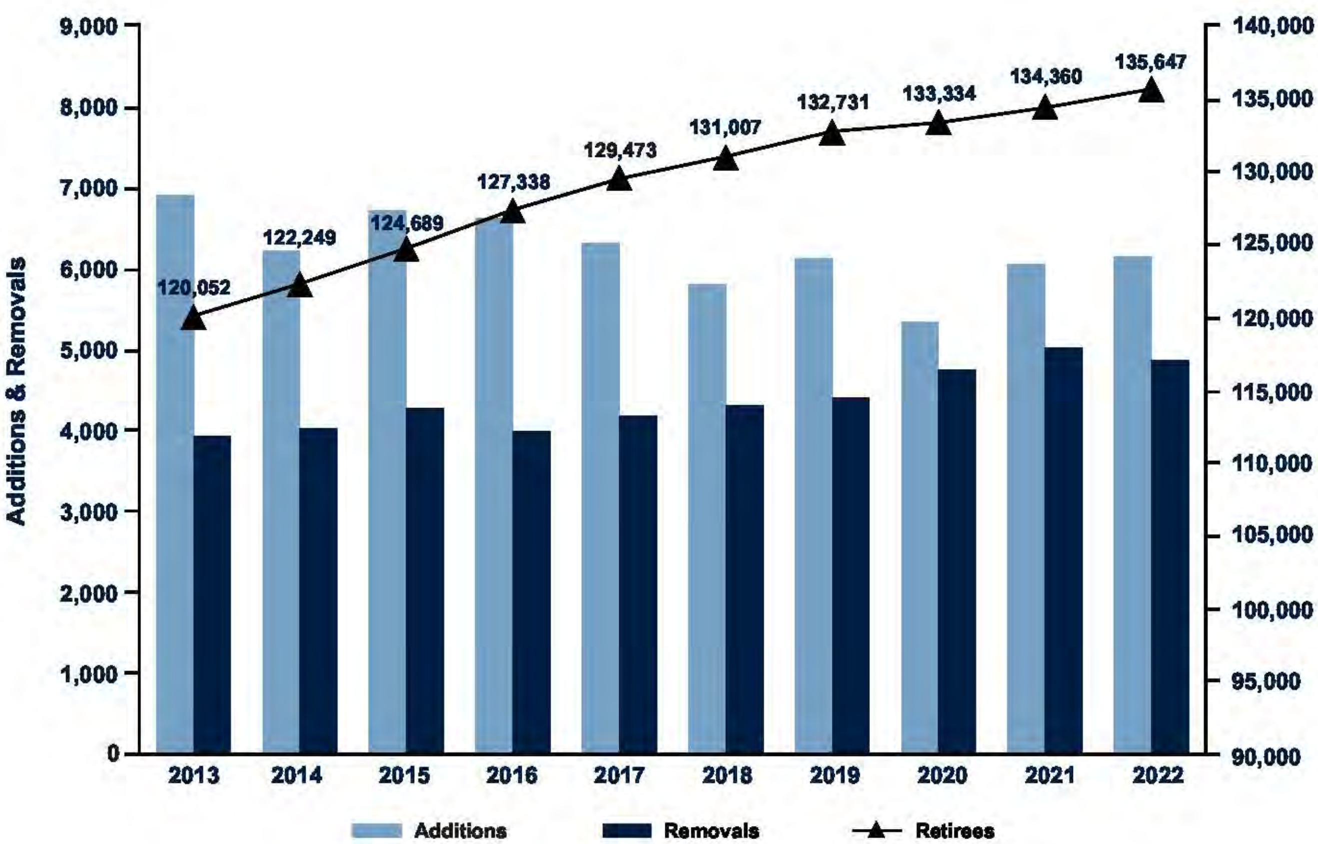
## Schedule of Retirees and Beneficiaries Added to and Removed from Rolls

December 31, 2022 (unaudited)

### Retirees and Beneficiaries Added to and Removed from Rolls

| | Added to Rolls | | Removed from Rolls | | Rolls - End of Year | | Percentage Change | |
|---|---|---|---|---|---|---|---|---|
| Year Ended | No. | Allowances | No. | Allowances | No. | Allowances[1/] | No. | Allowances |
| 2022 | 6,180 | $190,728,048 | 4,893 | $90,271,430 | 135,647 | $3,393,469,966 | 1.0% | 3.0% |
| 2021 | 6,085 | 194,538,188 | 5,059 | 91,133,818 | 134,360 | 3,293,477,182 | 0.8 | 3.2 |
| 2020 | 5,363 | 161,626,682 | 4,760 | 79,668,921 | 133,334 | 3,190,566,922 | 0.5 | 2.6 |
| 2019 | 6,132 | 176,664,651 | 4,408 | 72,004,815 | 132,731 | 3,108,945,258 | 1.3 | 3.5 |
| 2018 | 5,847 | 166,594,854 | 4,313 | 70,862,628 | 131,007 | 3,004,855,159 | 1.2 | 3.3 |
| 2017 | 6,338 | 178,317,205 | 4,203 | 63,576,892 | 129,473 | 2,909,267,596 | 1.7 | 4.1 |
| 2016 | 6,658 | 191,327,122 | 4,009 | 60,165,549 | 127,338 | 2,794,984,868 | 2.1 | 4.9 |
| 2015 | 6,743 | 175,810,502 | 4,303 | 63,027,188 | 124,689 | 2,664,418,763 | 2.0 | 4.4 |
| 2014 | 6,245 | 157,593,809 | 4,048 | 59,524,055 | 122,249 | 2,552,077,530 | 1.8 | 4.0 |
| 2013 | 6,944 | 178,392,487 | 3,953 | 53,186,262 | 120,052 | 2,454,388,693 | 2.6 | 5.4 |

[1/]Calculated by multiplying monthly benefit for December 31 by 12 to arrive at an annual amount.



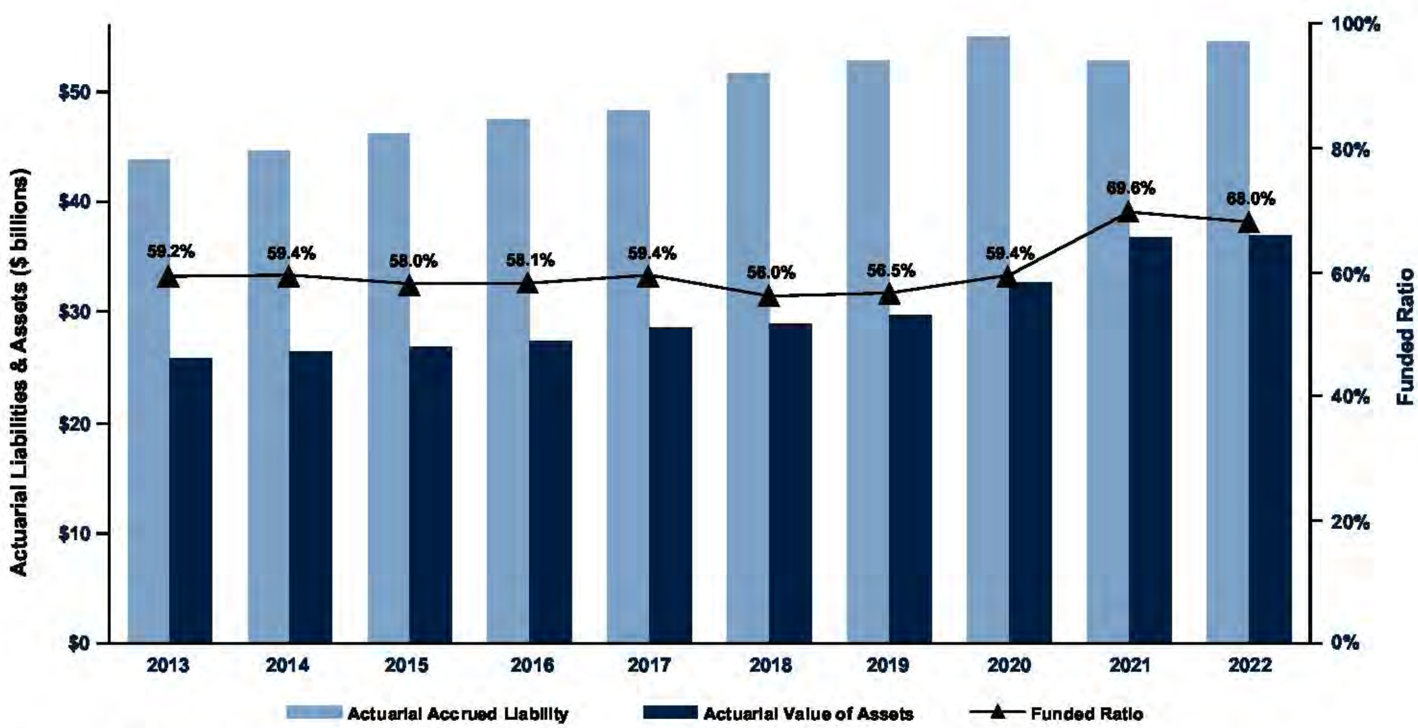
## Solvency Test

December 31, 2022 (unaudited)

### Fund Solvency[1/]

($ thousands)

| | Actuarial Accrued Liabilities For | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | | | Portion of Accrued Liabilities Covered by Reported Assets | | | |
| Valuation Year Ended Dec 31 | Active Member Contributions | Retirees and Beneficiaries | Active Members (Employer Financed Portion) | Total Actuarial Accrued Liability (AAL) | Actuarial Value of Assets | (1) | (2) | (3) | Funded Ratio |
| 2022 | $5,456,160 | $33,847,728 | $15,309,899 | $54,613,787 | $37,124,677 | 100.0% | 93.6% | 0.0% | 68.0% |
| 2021 | 5,414,329 | 32,664,861 | 14,847,656 | 52,926,846 | 36,846,611 | 100.0 | 96.2 | 0.0 | 69.6 |
| 2020 | 5,327,815 | 31,754,551 | 18,016,392 | 55,098,758 | 32,703,275 | 100.0 | 86.2 | 0.0 | 59.4 |
| 2019 | 5,183,195 | 29,651,542 | 18,137,838 | 52,972,575 | 29,934,024 | 100.0 | 83.5 | 0.0 | 56.5 |
| 2018 | 5,074,760 | 28,558,283 | 18,149,162 | 51,782,205 | 28,989,607 | 100.0 | 83.7 | 0.0 | 56.0 |
| 2017 | 4,965,765 | 27,798,045 | 15,675,593 | 48,439,403 | 28,776,939 | 100.0 | 85.7 | 0.0 | 59.4 |
| 2016 | 4,869,229 | 26,824,306 | 15,825,429 | 47,518,964 | 27,596,048 | 100.0 | 84.7 | 0.0 | 58.1 |
| 2015 | 4,816,121 | 25,156,125 | 16,356,683 | 46,328,929 | 26,877,127 | 100.0 | 87.7 | 0.0 | 58.0 |
| 2014 | 4,733,833 | 23,872,658 | 16,144,179 | 44,750,670 | 26,584,948 | 100.0 | 91.5 | 0.0 | 59.4 |
| 2013 | 4,636,219 | 23,046,717 | 16,191,644 | 43,874,580 | 25,975,185 | 100.0 | 92.6 | 0.0 | 59.2 |




[1/]Based on statutory funding requirements.

## Analysis of Financial Experience

December 31, 2022 (unaudited)

### Gains and Losses in Accrued Liabilities[1]

Resulting from Differences Between Assumed Experience and Actual Experience

($ thousands)

| Type of Activity | 2022 | 2021 | 2020 | 2019 |
|---|---|---|---|---|
| (Loss)/gain from investment earnings[2] | ($572,026) | $1,383,743 | $625,338 | ($102,778) |
| Changes in demographics of new entrants | 0 | (51,558) | 58,259 | 191,167 |
| Pay increases different than assumptions | (352,661) | 63,451 | (178,582) | (23,014) |
| Differences between actual and expected demographic experience | (238,357) | (52,115) | (63,639) | 49,496 |
| **(Loss)/gain during year from financial experience** | **(1,163,044)** | **1,343,521** | **441,376** | **114,871** |
| Non-recurring items | | | | |
| Changes in funding method[3] | 0 | 3,699,984 | 0 | 0 |
| Changes in demographic assumptions | 0 | 0 | (700,180) | 0 |
| Changes in economic assumptions[4] | (671,544) | 0 | (599,077) | (749,930) |
| **Composite (loss)/gain** | **($1,834,588)** | **$5,043,505** | **($857,881)** | **($635,059)** |

[1] Based on statutory funding requirements.

[2] Net gains and losses from returns different than the assumed rate of return that are amortized over a five-year period.

[3] Act 2017-5 required SERS to convert to the traditional entry-age funding method beginning with 2021, which brings it in line with the accounting valuation.

[4] 2022 change primarily due to a reduction in the annual investment return to 6.875% from 7.0%, which was approved by SERS Board at its June 10, 2022 meeting. 2020 change primarily due to reduction of investment rate of return to 7.0% from 7.125%, which was approved by SERS Board at its July 2020 meeting, while 2019 change primarily due to reduction of investment rate of return to 7.125% from 7.25%, which was approved by SERS Board at its June 2019 meeting.

## Schedule of Funding Progress

December 31, 2022 (unaudited)

### Funding Progress[1/]

($ thousands)

| Actuarial Valuation Year Ended December 31 | Actuarial Value of Assets | Actuarial Accrued Liabilities (AAL) | Ratio of Assets to AAL | Unfunded Actuarial Accrued Liability (UAAL) | Covered Payroll | UAAL as a Percentage of Covered Payroll |
|---|---|---|---|---|---|---|
| 2022 | $37,124,677 | $54,613,787 | 68.0% | $17,489,110 | $6,547,630 | 267.1% |
| 2021 | 36,846,611 | 52,926,846 | 69.6 | 16,080,235 | 6,383,604 | 251.9 |
| 2020 | 32,703,275 | 55,098,758 | 59.4 | 22,395,483 | 6,441,578 | 347.7 |
| 2019 | 29,934,024 | 52,972,575 | 56.5 | 23,038,551 | 6,328,566 | 364.0 |
| 2018 | 28,989,607 | 51,782,205 | 56.0 | 22,792,598 | 6,178,772 | 368.9 |
| 2017 | 28,776,939 | 48,439,403 | 59.4 | 19,662,464 | 5,984,361 | 328.6 |
| 2016 | 27,596,048 | 47,518,964 | 58.1 | 19,922,916 | 5,911,603 | 337.0 |
| 2015 | 26,877,127 | 46,328,929 | 58.0 | 19,451,802 | 5,971,511 | 325.7 |
| 2014 | 26,584,948 | 44,750,670 | 59.4 | 18,165,722 | 5,719,581 | 317.6 |
| 2013 | 25,975,185 | 43,874,580 | 59.2 | 17,899,395 | 5,598,420 | 319.7 |

[1/] Based on statutory funding requirements.

## Schedule of Contributions Under Previous Reporting Standards

December 31, 2022 (unaudited)

### Contributions Under Previous Reporting Standards[1]

Annual Required Contributions Using GASB 25

($ thousands)

| Actuarial Valuation Year Ended December 31 | Annual Required Contribution (ARC) | Actual Contribution | Actual Contribution as a Percentage of ARC |
|---|---|---|---|
| 2022[2] | $2,066,132 | $2,066,132 | 100.0% |
| 2021[2] | 2,078,951 | 2,858,088[3] | 137.5 |
| 2020[2] | 2,164,144 | 3,174,854[4] | 146.7 |
| 2019[2] | 2,106,138 | 2,106,138 | 100.0 |
| 2018[2] | 2,040,434 | 2,040,434 | 100.0 |
| 2017[2] | 1,883,541 | 1,883,541 | 100.0 |
| 2016[2] | 1,613,626 | 1,613,626 | 100.0 |
| 2015 | 1,469,116 | 1,359,246 | 92.5 |
| 2014 | 1,407,361 | 1,081,826 | 76.9 |
| 2013 | 1,314,925 | 790,996 | 60.2 |

[1] The ARC is calculated as part of SERS funding valuation using GASB 25 requirements. Starting in 2014 GASB 25 was superseded by GASB 67 for accounting purposes. GASB 67 replaces the ARC with an actuarially determined contribution (ADC). While no longer applicable to 2014 and subsequent years, this disclosure is being provided for informational purposes.

[2] ARC excludes multiple service transfers made to SERS. These transfers are included as contributions on the Statements of Changes in Fiduciary Net Position.

[3] Includes a one-time lump sum payment from the Pennsylvania State System of Higher Education, less credits utilized during the year.

[4] Includes a one-time lump sum payment from Penn State University, less credits utilized during the year.

For developing the ARC, GASB 25 established a range of actuarial cost and amortization methods for the unfunded actuarial accrued liability. The scheduled contributions for the years shown above have been below the amount required to meet the GASB minimum under previous standards.

Underfunding of the ARC from 2013 through 2015 was the result of significant provisions of Act 2010-120, which capped increases in the employer contribution rate. The capped contribution rates during those years were below the respective years' ARC contribution rates.

## History and Projection of Contribution Rates and Funded Ratios

December 31, 2022 (unaudited)

### Contribution Rates and Funded Ratios[1]

($ thousands)

| Valuation Year Ended Dec 31 | Funding Payroll | For FY Beginning July 1 Following Valuation Year[2] Member Contribution Rate[3] | Employer Normal Cost Rate | Unfunded Liability Rate | Preliminary Employer Contribution Rate[4] | Final Employer Contribution Rate | Funded Ratio |
|---|---|---|---|---|---|---|---|
| 2013[5] | $5,897,627 | 6.25% | 5.00% | 26.41% | 31.41% | 20.50% | 59.2% |
| 2014 | 6,021,688 | 6.25 | 4.95 | 26.56 | 31.51 | 25.00 | 59.4 |
| 2015 | 6,255,189 | 6.25 | 4.52 | 27.62 | 32.14 | 29.50 | 58.0 |
| 2016 | 6,187,427 | 6.25 | 4.91 | 28.31 | 33.22 | 33.22 | 58.1 |
| 2017[6] | 6,265,071 | 6.25 | 4.88 | 28.02 | 32.90 | 32.90 | 59.4 |
| 2018 | 6,469,401 | 6.25 | 1.25 | 32.28 | 33.53 | 33.53 | 56.0 |
| 2019[7] | 6,657,541 | 6.25 | 1.67 | 31.78 | 33.45 | 33.45 | 56.5 |
| 2020[8] | 6,700,320 | 6.25 | 1.50 | 32.26 | 33.76 | 33.76 | 59.4 |
| 2021[9] | 6,649,292 | 6.25 | 8.32 | 25.78 | 34.10 | 34.10 | 69.6 |
| 2022 | 6,832,806 | 6.18 | 8.29 | 26.98 | 35.27 | 35.27 | 68.0 |
| 2023[10] | 7,103,608 | 6.04 | 8.22 | 25.90 | 34.12 | 34.12 | 69.4 |
| 2024 | 7,261,728 | 6.00 | 7.95 | 25.93 | 33.88 | 33.88 | 69.6 |
| 2025 | 7,427,966 | 5.96 | 7.69 | 26.33 | 34.02 | 34.02 | 69.3 |
| 2026 | 7,597,715 | 5.92 | 7.43 | 27.43 | 34.86 | 34.86 | 67.8 |
| 2027 | 7,770,025 | 5.88 | 7.17 | 26.91 | 34.08 | 34.08 | 69.1 |
| 2028 | 7,944,988 | 5.84 | 6.92 | 26.37 | 33.29 | 33.29 | 70.5 |
| 2029 | 8,122,001 | 5.81 | 6.68 | 25.81 | 32.49 | 32.49 | 72.0 |
| 2030 | 8,304,471 | 5.77 | 6.45 | 25.22 | 31.67 | 31.67 | 73.5 |
| 2031 | 8,492,036 | 5.74 | 6.24 | 24.70 | 30.94 | 30.94 | 75.2 |
| 2032 | 8,685,872 | 5.71 | 6.03 | 24.22 | 30.25 | 30.25 | 77.0 |

[1] Except as noted, the projection of contribution rates is based on the assumption that there are no changes in SERS statutory funding methodology, no changes in demographics or economic assumptions, no changes in benefit provisions, and no actuarial gains or losses on the actuarial value of assets that result from recognizing currently deferred gains or losses on the fair value of assets. All information on this page is based on statutory funding requirements.

[2] Rates and values are for the fiscal year beginning July 1 following the valuation year and do not include Benefits Completion Plan contributions.

[3] Prior to December 31, 2022, 6.25% was for Class AA and A-3 employees since they comprised most of SERS membership. Beginning with December 31, 2022, the expected fiscal year rate represents a blend of the membership since employee contributions for non-exempt new hires have a lower contribution rate.

[4] Actuarial rate before floor and collar.

[5] Act 2010-120 amended the Retirement Code to place a collar on increases to employer contribution rates starting July 1, 2011. A 4.50% collar was in place for fiscal year beginning July 1, 2013, and continued onward until the collar was deemed unnecessary.

[6] Act 2010-120 amended the Retirement Code to place a permanent floor at employer normal cost after collars expire.

[7] Act 2017-5 amended the Retirement Code to add two hybrid Defined Benefits (DB)/Defined Contributions (DC) plans and a DC-only plan effective January 1, 2019.

[8] The Penn State $1.061 billion one-time lump sum payment immediately reduced the total SERS unfunded liability and increased the funded ratio.

[9] Act 2017-5 amended the Retirement Code to change the funding method to Traditional Entry Age. The funding method change along with the PASSHE $825 million one-time lump sum payment immediately reduced the total SERS unfunded liability and increased the funded ratio.

[10] Numbers are projected from 2023 – 2032 based on 2022 actuarial funding valuation.

### Benefit and Contribution Provisions

SERS makes provisions for retirement, disability, and death benefits for all state employees, except for those specifically excluded under section 5301 of the State Employees' Retirement Code, and certain other eligible groups. The major provisions may be summarized as follows:

### Eligible Employees

#### Class A

All regular state employees, employees of certain commissions and authorities, employees of state-owned educational institutions, and the Pennsylvania State University (unless such employees have joined the Public School Employees' Retirement System (PSERS), TIAA, or Alternative Retirement Program (ARP)) hired before July 1, 2001, who did not elect into the class AA membership as of December 31, 2001. This excludes judges and Magisterial District Judges who have elected class E-1 or class E-2.

#### Class AA

All regular state employees who are hired after June 30, 2001, and before January 1, 2011, and former class A state employees hired before July 1, 2001, who elected into class AA as of December 31, 2001. This includes employees of certain commissions and authorities, employees of state-owned educational institutions, and the Pennsylvania State University (unless such employees have joined PSERS, TIAA, or ARP), but excludes state police troopers, judges, Magisterial District Judges, and legislators with class D-4.

#### Class A-3

All regular state employees who enter SERS membership for the first time on or after January 1, 2011 and before January 1, 2019, and all legislators who became members on or after December 1, 2010; Capitol police and park rangers who became members starting July 1, 2011; and state police officers who became members starting July 1, 2012, provided the member did not elect membership in the optional A-4 class within 45 days of becoming a member.

Starting January 1, 2019, class A-3 is only offered to state employees in exempt positions.

#### Class A-4

All members who would be class A-3 but elected A-4 within 45 days of becoming a member.

#### Class A-5

All regular state employees who enter SERS membership for the first time on or after January 1, 2019, and SERS members hired before January 1, 2019, who were given a one-time, irrevocable option to elect class A-5 as of April 1, 2019, starting July 1, 2019, while retaining prior class up to July 1, 2019, including members of the General Assembly, judges, and Magisterial District Judges.

#### Class A-6

All members who would be class A-5 but elected A-6 within 45 days of becoming a member, and SERS members hired before January 1, 2019, who were given a one-time, irrevocable option to elect class A-6 as of April 1, 2019, starting July 1, 2019, while retaining prior class up to July 1, 2019.

#### Defined Contribution-Only Plan

All members who would be class A-5 but elected the defined contribution-only plan within 45 days of becoming a member, and SERS members hired before January 1, 2019, who were given a one-time, irrevocable option to elect defined contribution-only plan as of April 1, 2019, starting July 1, 2019, while retaining prior class up to July 1, 2019. Those members choosing the defined contribution-only plan are not eligible for a benefit from the Defined Benefit Plan; but retire with their contributions, employer contributions if vested with three eligibility points, and any investment earnings on those contributions less investment expenses and fees, however SERS members hired before January 1, 2019, who elected defined contribution-only plan as of April 1, 2019, starting July 1, 2019, still retained their eligibility for a benefit from the Defined Benefit Plan for service up to July 1, 2019.

## Summary of Plan Provisions

**December 31, 2022 (unaudited)**

### Class D-4

Legislators coming into service after June 30, 2001, and before December 1, 2010, who elect to be SERS members and legislators who elected class D-4 before July 1, 2001.

### Class E-1

Judges who elect class E-1.

### Class E-2

Magisterial District Judges who elect class E-2.

### Age and Service Requirements for Superannuation (Normal Retirement) in Defined Benefit Plan

(Full Formula Benefit)

### Class AA/A

Age 60 with three years of service; except for members of the General Assembly, enforcement officers, correction officers, psychiatric security aides, and officers of the Delaware River Port Authority for whom the requirement is age 50 with three years of service. Members of class AA/A with 35 years of credited service are entitled to full formula benefits regardless of age. State police officers can retire on full benefits after age 50 or with 20 years of service. Capitol police and park rangers can retire on full benefits at age 50 with 20 years of Capitol police or park ranger service.

### Class A-3/A-4

Age 65 for most members with three years of service, and age 55, with three years of service, for members of the General Assembly, enforcement officers, correction officers, psychiatric security aides, Delaware River Port Authority police officers, and officers of the Pennsylvania State Police. Capitol police officers and park rangers can retire on full benefits at age 55 with 20 or more years of credited service in the classification. Members of class A-3/A-4 are eligible for full formula benefits with 35 years of credited service with a superannuation score of 92.

### Class A-5/A-6

Age 67, with three years of service; or eligible for full formula benefits with 35 years of credited service with a superannuation score of 97.

### Class D-4

Age 50, with three years of service.

### Class E-1

Age 60, with three years of service; or 35 or more years of credited service, regardless of age.

### Class E-2

Age 60, with three years of service; or 35 or more years of credited service, regardless of age.

### Formula for Superannuation (Normal) Annuity in Defined Benefit Plan

The maximum single-life annuity for most members is 2% of the highest three-year average salary of the member multiplied by years and fractions of credited service multiplied by the multiplier of the class of membership. For A-5 and A-6 members the maximum single-life annuity is 2% of an average of the highest five calendar years of the member multiplied by years and fractions of credited service multiplied by the multiplier of the class of membership.

The annuity paid to a member shall not exceed the member's highest salary during any period of 12 consecutive months of creditable service.

The Defined Benefit Plan multiplier for each of the major classes are as follows:

### Defined Benefit Plan Multiplier for Major Classes

| Class | Multiplier | |
|---|---|---|
| A[1/] | 1.00 | |
| AA | 1.25 | |
| A-3[1/] | 1.00 | |
| A-4[1/] | 1.25 | |
| A-5 | 0.625 | |
| A-6 | 0.50 | |
| D-4 | 1.50 | |
| E-1 | 2.00 | For each of the first 10 years of judicial service dropping to 1.5 for each subsequent year of judicial service. |
| E-2 | 1.50 | For each year of judicial service. |

[1/]For state police with 20 – 24.99 years of service, the benefit is 50% of the highest annual salary; with 25 or more years of service, the benefit is 75% of the highest annual salary.

NOTE: There are conditions under which long-service members or members retiring at advanced ages may receive somewhat larger benefits than those described above. Further, benefit limitations exist for most members of SERS.

# Statistical Section

pennsylvania

STATE EMPLOYEES' RETIREMENT SYSTEM

100 YEARS OF SERVICE

MAKING A DIFFERENCE - THEN. NOW. TOMORROW.

## Statistical Section Narrative

**December 31, 2022 (unaudited)**

The Statistical Section of SERS' Annual Comprehensive Financial Report presents detailed information related to the financial statements, as well as highlights of actuarial valuations. The Statistical Section presents information on the Defined Benefit Plan as well as select information for the Defined Contribution Plan, which opened for enrollment on January 1, 2019. The schedules in this section are classified into the following four categories: financial trends, revenue capacity, demographic and economic information, and operating information.

### Financial Trends

The **Schedule of Trend Data** provides key financial, actuarial, and demographic data for 10 years ended December 31, 2022. This data includes items such as employer and member contribution rates; contributions received and benefits paid by SERS; values of assets and liabilities; and the number of annuitants, beneficiaries, and active members.

The **Schedule of Additions to Fiduciary Net Position** presents the member/participant and employer contributions, net investment income/loss, and other additions.

The **Schedule of Deductions from Fiduciary Net Position** presents the benefits, refunds of contributions, and administrative expenses.

The **Schedule of Benefit and Refund Deductions from Fiduciary Net Position by Type** presents the amount of benefit payments and refunds by type for the 10 years ended December 31, 2022. Most Defined Benefit Plan benefit types are either normal or early, which is determined by the number of years of service and/or age at retirement.

The **Schedule of Total Changes in Fiduciary Net Position** combines the additions to and deductions from fiduciary net position from the Schedule of Additions to Fiduciary Net Position and Schedule of Deductions from Fiduciary Net Position to arrive at net increase/decrease of changes in fiduciary net position.

### Revenue Capacity

The **Schedule of Investment Income** presents the details of the total net investment income/loss for the 10 years ended December 31, 2022. The Defined Benefit Plan has two external sources of revenue and one own-source (internal) of revenue. Employer contributions and member contributions, which information is provided for in the Schedule of Additions to Fiduciary Net Position, are the two external sources of revenue, and investment income is SERS own-source revenue. Since investment income/loss has the greatest impact to SERS, this schedule provides more detail on the major components of the investment income/loss, which is also disclosed in total on the Schedule of Additions to Fiduciary Net Position.

### Demographic and Economic Information

The **Schedules of Active Member and Participant Statistics** provides the total number of active members and participants, as well as the average age, average service, and average salary by gender for the 10 years ended December 31, 2022.

### Operating Information

The **Schedule of Retired Members by Type of Benefit** presents, for given benefit ranges, the total number of retirees, total monthly benefits, and total number of retirees by retirement type as of December 31, 2022.

The **Schedule of Retired Members by Option** presents, for given benefit ranges, the total number of retirees, total monthly benefits, and total number of retirees by retirement option as of December 31, 2022.

The **Schedule of Average Monthly Benefit Payments** presents, in five-year increments of credited service, the average monthly benefit, average final average salary, and number of retired members for the 10 years ended December 31, 2022.

## Statistical Section Narrative

**December 31, 2022 (unaudited)**

The **Schedule of Average Annual Benefit Payments** presents, in five-year age increments and by gender, the average annual benefit for each major retirement type as of December 31, 2022.

The **Schedule of Employer/Agency Participation** provides the number of covered members/participants and the corresponding percentage of participation for the five largest employers/agencies for the Defined Benefit and Defined Contribution Plans, as well as a listing of additional employers/agencies participating with both plans as of December 31, 2022.

Sources: Unless otherwise noted, the information for these schedules is derived from the Financial Section and Actuarial Section of the Annual Comprehensive Financial Report for the relevant year.

## Schedule of Trend Data

December 31, 2022 (unaudited)

### Defined Benefit Plan Trend Data[1]

| | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Year-End Contribution Rates** | | | | | | | | | | |
| Employer[2,3,4] | 34.16% | 33.81% | 33.48% | 33.59% | 32.93% | 33.24% | 29.51%[7] | 25.01%[7] | 20.53%[7] | 16.05%[7] |
| Member | 6.05% | 6.09% | 4.96% | 4.95%[8] | 6.25% | 6.25% | 6.25% | 6.25% | 6.25% | 6.25% |
| **Contributions** | | | | | | | | | | |
| Employer[2] | $2,074,999 | $2,871,253 | $3,186,445 | $2,114,882 | $2,048,594 | $1,897,404 | $1,622,123 | $1,360,431 | $1,084,104 | $794,911 |
| Member | $418,589 | $405,138 | $409,637 | $404,769 | $393,925 | $383,359 | $374,570 | $371,624 | $365,923 | $351,968 |
| Average Annual Compensation | $67,925 | $65,234 | $63,802 | $61,532 | $59,984 | $58,113 | $56,499 | $56,858 | $54,769 | $53,224 |
| Fiduciary Net Position (FNP) | $33,607,207 | $40,231,015 | $35,027,730 | $31,096,319 | $26,936,990 | $29,405,042[9] | $26,387,889 | $26,054,890 | $27,337,778 | $27,394,156 |
| Total Pension Liability (TPL)[5] | $54,622,092 | $52,936,505 | $52,253,754 | $49,274,314 | $47,768,011 | $46,696,751 | $45,648,214 | $44,238,721 | $42,195,186 | $41,057,541 |
| FNP as % of TPL[5] | 61.5% | 76.0% | 67.0% | 63.1% | 56.4% | 63.0% | 57.8% | 58.9% | 64.8% | 66.7% |
| Net Pension Liability[5] | $21,014,885 | $12,705,490 | $17,226,024 | $18,177,995 | $20,831,021 | $17,291,709 | $19,260,325 | $18,183,831 | $14,857,408 | $13,663,385 |
| Actuarial Value of Assets[4] | $37,124,677 | $36,846,611 | $32,703,275 | $29,934,024 | $28,989,607 | $28,776,939 | $27,596,048 | $26,877,127 | $26,584,948 | $25,975,185 |
| Actuarial Accrued Liability[4] | $54,613,787 | $52,926,846 | $55,098,758 | $52,972,575 | $51,782,205 | $48,439,403 | $47,518,964 | $46,328,929 | $44,750,670 | $43,874,580 |
| Funded Ratio[4] | 68.0% | 69.6% | 59.4% | 56.5% | 56.0% | 59.4% | 58.1% | 58.0% | 59.4% | 59.2% |
| Total Benefits and Refunds | $3,885,026 | $3,731,143 | $3,556,728 | $3,512,671 | $3,394,636 | $3,303,543 | $3,227,548 | $3,080,861 | $2,946,465 | $2,844,285 |
| Average Pension[6] | $31,331 | $30,712 | $30,050 | $29,440 | $28,880 | $28,352 | $27,722 | $27,042 | $26,426 | $25,839 |
| Annuitants and Beneficiaries | 135,647 | 134,360 | 133,334 | 132,731 | 131,007 | 129,473 | 127,338 | 124,689 | 122,249 | 120,052 |
| Active Members | 96,395 | 97,857 | 100,962 | 102,850 | 103,007 | 102,978 | 104,632 | 105,025 | 104,431 | 105,186 |

[1] All dollar amounts are in thousands, except Average Annual Compensation and Average Pension.
[2] Includes Benefits Completion Plan contribution.
[3] Employer rate represents total contributions as a percent of covered payroll at December 31.
[4] Based on actuarial valuation for funding purposes as required by statute.
[5] Based on actuarial valuation for financial purposes as required by Governmental Accounting Standards Board (GASB) Statement No. 67.
[6] Represents average annual pension only for members who have reached superannuation through age or service credits.
[7] Act 2010-120 set collars on the increase of the employer contribution rate at 3.5% effective July 1, 2012 and 4.5% every year thereafter until no longer needed.
[8] Act 2017-5 established a new side-by-side hybrid defined benefit/defined contribution benefit option and a new DC-only option to all state employees, excluding most hazardous duty employees. This reduced the member contribution rate.
[9] In 2017, fiduciary net position excluded OPEB adjustment by GASB 75.

Source: Pennsylvania State Employees' Retirement System

## Schedule of Additions to Fiduciary Net Position

December 31, 2022 (unaudited)

### Defined Benefit Plan Additions to Fiduciary Net Position

($ thousands)

| Year Ended | Member Contributions | Employer Contributions: Dollar Amount | Employer Contributions: % of Covered-Employee Payroll[1/] | Net Investment Income/(Loss) | Total |
|---|---|---|---|---|---|
| 2022 | $418,589 | $2,074,999 | 31.7% | ($5,213,344) | ($2,719,756) |
| 2021 | 405,138 | 2,871,253 | 45.0 | 5,682,480 | 8,958,871 |
| 2020 | 409,637 | 3,186,445 | 49.5 | 3,919,279 | 7,515,361 |
| 2019 | 404,769 | 2,114,882 | 33.4 | 5,175,624 | 7,695,275 |
| 2018 | 393,925 | 2,048,594 | 33.2 | (1,442,291) | 1,000,228 |
| 2017 | 383,359 | 1,897,404 | 31.7 | 4,066,055 | 6,346,818 |
| 2016 | 374,570 | 1,622,123 | 27.4 | 1,586,853 | 3,583,546 |
| 2015 | 371,624 | 1,360,431 | 22.8 | 87,990 | 1,820,045 |
| 2014 | 365,923 | 1,084,104 | 19.0 | 1,462,051 | 2,912,078 |
| 2013 | 351,968 | 794,911 | 14.2 | 3,724,038 | 4,870,917 |

[1/]Calculated by dividing employer contributions by total annualized compensation (covered-employee payroll) provided by actuary.

### Defined Contribution Plan Additions to Fiduciary Net Position[1/]

($ thousands)

| Year Ended | Participant Contributions | Employer Contributions | Annual Employer Charge/ Commonwealth Funding | Net Investment Income/(Loss) | Total |
|---|---|---|---|---|---|
| 2022 | $31,372 | $16,750 | $1,288 | ($14,025) | $35,385 |
| 2021 | 22,533 | 11,440 | 1,696 | 7,470 | 43,139 |
| 2020 | 14,799 | 7,733 | 4,556 | 4,971 | 32,059 |
| 2019 | 6,124 | 2,836 | 3,852 | 673 | 13,485 |

[1/]Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

Source: Pennsylvania State Employees' Retirement System

## Schedule of Deductions from Fiduciary Net Position

December 31, 2022 (unaudited)

### Defined Benefit Plan Deductions from Fiduciary Net Position

($ thousands)

| Year Ended | Benefits | Refund of Contributions | Administrative Expenses | Total |
|---|---|---|---|---|
| 2022 | $3,852,073 | $32,953 | $19,026 | $3,904,052 |
| 2021 | 3,705,674 | 25,469 | 24,443 | 3,755,586 |
| 2020 | 3,538,634 | 18,094 | 27,222 | 3,583,950 |
| 2019 | 3,490,311 | 22,360 | 23,275 | 3,535,946 |
| 2018 | 3,375,394 | 19,242 | 25,950 | 3,420,586 |
| 2017 | 3,287,923 | 15,620 | 26,122 | 3,329,665 |
| 2016 | 3,214,440 | 13,108 | 22,999 | 3,250,547 |
| 2015 | 3,069,328 | 11,533 | 22,072 | 3,102,933 |
| 2014 | 2,936,591 | 9,874 | 21,991 | 2,968,456 |
| 2013 | 2,833,676 | 10,609 | 21,811 | 2,866,096 |

### Defined Contribution Plan Deductions from Fiduciary Net Position[1/]

($ thousands)

| Year Ended | Benefits | Refund of Contributions | Administrative Expenses | Total |
|---|---|---|---|---|
| 2022 | $1,886 | $1,116 | $4,601 | $7,603 |
| 2021 | 783 | 868 | 3,971 | 5,622 |
| 2020 | 201 | 103 | 3,660 | 3,964 |
| 2019 | 52 | 20 | 5,185 | 5,257 |

[1/]Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

Source: Pennsylvania State Employees' Retirement System

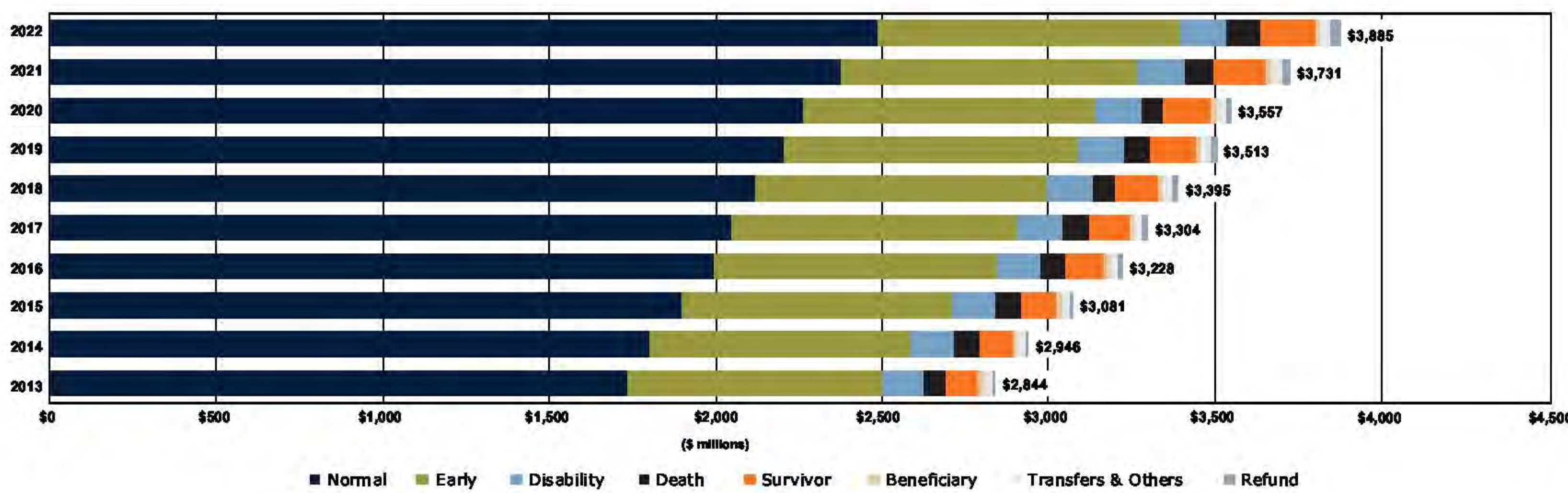
## Schedule of Benefit and Refund Deductions from Fiduciary Net Position by Type

December 31, 2022 (unaudited)

### Defined Benefit Plan Benefit and Refund Deductions from Fiduciary Net Position by Type

($ thousands)

| | Retirement | | | | | | | | Refunds | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year Ended | Normal | Early | Disability | Death | Survivor | Beneficiary | Transfers & Other | Total Benefit Deductions | Separation of Service | Death | Total Refunds |
| 2022 | $2,490,656 | $908,788 | $142,545 | $96,539 | $168,662 | $16,916 | $27,967 | $3,852,073 | $31,833 | $1,120 | $32,953 |
| 2021 | 2,379,999 | 892,807 | 141,257 | 87,658 | 157,459 | 16,856 | 29,638 | 3,705,674 | 24,788 | 681 | 25,469 |
| 2020 | 2,264,119 | 881,623 | 140,813 | 61,629 | 145,877 | 15,860 | 28,713 | 3,538,634 | 17,535 | 559 | 18,094 |
| 2019 | 2,207,145 | 888,899 | 139,607 | 74,257 | 137,479 | 16,855 | 26,069 | 3,490,311 | 21,932 | 428 | 22,360 |
| 2018 | 2,122,512 | 877,579 | 137,616 | 66,408 | 129,533 | 15,581 | 26,165 | 3,375,394 | 19,009 | 233 | 19,242 |
| 2017 | 2,051,059 | 859,554 | 135,707 | 80,322 | 121,511 | 16,510 | 23,260 | 3,287,923 | 15,372 | 248 | 15,620 |
| 2016 | 1,997,704 | 851,302 | 132,833 | 76,455 | 114,465 | 15,976 | 25,705 | 3,214,440 | 12,861 | 247 | 13,108 |
| 2015 | 1,900,468 | 816,595 | 129,810 | 75,845 | 106,748 | 16,066 | 23,796 | 3,069,328 | 11,302 | 231 | 11,533 |
| 2014 | 1,803,669 | 789,723 | 126,457 | 78,580 | 100,527 | 15,510 | 22,125 | 2,936,591 | 9,723 | 151 | 9,874 |
| 2013 | 1,737,107 | 769,385 | 121,640 | 71,216 | 93,919 | 17,271 | 23,138 | 2,833,676 | 10,318 | 291 | 10,609 |




Source: Pennsylvania State Employees' Retirement System

## Schedule of Total Changes in Fiduciary Net Position

December 31, 2022 (unaudited)

### Defined Benefit Plan Total Changes in Fiduciary Net Position

($ thousands)

| | Additions to Fiduciary Net Position | | | | Deductions from Fiduciary Net Position | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year Ended | Member Contributions | Employer Contributions | Net Investment Income/ (Loss) | Total Additions | Benefits | Refund of Contributions | Administrative Expenses | Total Deductions | Net Increase/ (Decrease) |
| 2022 | $418,589 | $2,074,999 | ($5,213,344) | ($2,719,756) | $3,852,073 | $32,953 | $19,026 | $3,904,052 | ($6,623,808) |
| 2021 | 405,138 | 2,871,253 | 5,682,480 | 8,958,871 | 3,705,674 | 25,469 | 24,443 | 3,755,586 | 5,203,285 |
| 2020 | 409,637 | 3,186,445 | 3,919,279 | 7,515,361 | 3,538,634 | 18,094 | 27,222 | 3,583,950 | 3,931,411 |
| 2019 | 404,769 | 2,114,882 | 5,175,624 | 7,695,275 | 3,490,311 | 22,360 | 23,275 | 3,535,946 | 4,159,329 |
| 2018 | 393,925 | 2,048,594 | (1,442,291) | 1,000,228 | 3,375,394 | 19,242 | 25,950 | 3,420,586 | (2,420,358) |
| 2017 | 383,359 | 1,897,404 | 4,066,055 | 6,346,818 | 3,287,923 | 15,620 | 26,122 | 3,329,665 | 3,017,153 |
| 2016 | 374,570 | 1,622,123 | 1,586,853 | 3,583,546 | 3,214,440 | 13,108 | 22,999 | 3,250,547 | 332,999 |
| 2015 | 371,624 | 1,360,431 | 87,990 | 1,820,045 | 3,069,328 | 11,533 | 22,072 | 3,102,933 | (1,282,888) |
| 2014 | 365,923 | 1,084,104 | 1,462,051 | 2,912,078 | 2,936,591 | 9,874 | 21,991 | 2,968,456 | (56,378) |
| 2013 | 351,968 | 794,911 | 3,724,038 | 4,870,917 | 2,833,676 | 10,609 | 21,811 | 2,866,096 | 2,004,821 |

### Defined Contribution Plan Total Changes in Fiduciary Net Position[1]

($ thousands)

| | Additions to Fiduciary Net Position | | | | | Deductions from Fiduciary Net Position | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year Ended | Participant Contributions | Employer Contributions | Annual Employer Charge/ Commonwealth Funding | Net Investment Income/ (Loss) | Total Additions | Benefits | Refund of Contributions | Administrative Expenses | Total Deductions | Net Increase |
| 2022 | $31,372 | $16,750 | $1,288 | ($14,025) | $35,385 | $1,886 | $1,116 | $4,601 | $7,603 | $27,782 |
| 2021 | 22,533 | 11,440 | 1,696 | 7,470 | 43,139 | 783 | 868 | 3,971 | 5,622 | 37,517 |
| 2020 | 14,799 | 7,733 | 4,556 | 4,971 | 32,059 | 201 | 103 | 3,660 | 3,964 | 28,095 |
| 2019 | 6,124 | 2,836 | 3,852 | 673 | 13,485 | 52 | 20 | 5,185 | 5,257 | 8,228 |

[1]Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

Source: Pennsylvania State Employees' Retirement System

## Schedule of Investment Income

December 31, 2022 (unaudited)

### Defined Benefit Plan Investment Income

($ thousands)

| | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| Investment income/(loss) | | | | | | | | | | |
| From investing activities | | | | | | | | | | |
| Net appreciation/(depreciation) in fair value of investments | ($5,504,938) | $5,396,397 | $3,653,648 | $4,901,079 | ($1,733,999) | $3,710,739 | $1,233,501 | ($216,817) | $1,155,301 | $3,476,349 |
| Interest | 171,411 | 204,996 | 199,398 | 162,152 | 142,918 | 126,728 | 126,219 | 130,616 | 142,434 | 120,815 |
| Dividends | 196,466 | 159,733 | 162,817 | 182,853 | 203,533 | 260,013 | 273,733 | 223,927 | 246,528 | 204,214 |
| Real estate income | 76,519 | 87,796 | 48,510 | 101,283 | 74,115 | 95,533 | 89,327 | 108,844 | 93,167 | 99,314 |
| Miscellaneous income | 1,849 | 4,231 | 2,059 | 5,269 | 889 | 3,713 | 27,381 | 3,426 | 1,799 | 668 |
| Total investing activities income/(loss) | (5,058,693) | 5,853,153 | 4,066,432 | 5,352,636 | (1,312,544) | 4,196,726 | 1,750,161 | 249,996 | 1,639,229 | 3,901,360 |
| Investment expenses | (157,345) | (172,375) | (149,509) | (179,344) | (133,146) | (135,079) | (167,712) | (166,610) | (186,527) | (181,042) |
| Net income/(loss) from investing activities | (5,216,038) | 5,680,778 | 3,916,923 | 5,173,292 | (1,445,690) | 4,061,647 | 1,582,449 | 83,386 | 1,452,702 | 3,720,318 |
| From securities lending activities | | | | | | | | | | |
| Securities lending income | 2,993 | 1,891 | 2,617 | 2,587 | 3,771 | 4,883 | 4,893 | 5,105 | 9,917 | 4,326 |
| Securities lending expenses | (299) | (189) | (261) | (255) | (372) | (475) | (489) | (501) | (568) | (606) |
| Net income from securities lending activities | 2,694 | 1,702 | 2,356 | 2,332 | 3,399 | 4,408 | 4,404 | 4,604 | 9,349 | 3,720 |
| **Net investment income/(loss)** | **($5,213,344)** | **$5,682,480** | **$3,919,279** | **$5,175,624** | **($1,442,291)** | **$4,066,055** | **$1,586,853** | **$87,990** | **$1,462,051** | **$3,724,038** |

Source: Pennsylvania State Employees' Retirement System

## Schedules of Active Member and Participant Statistics

December 31, 2022 (unaudited)

### Defined Benefit Plan Active Member Statistics

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| Year Ended | Average Age | Average Service | Average Salary | Average Age | Average Service | Average Salary | Total Number of Active Members |
| 2022 | 46.04 | 11.50 | $72,502 | 47.15 | 10.89 | $61,970 | 96,395 |
| 2021 | 46.11 | 11.59 | 69,621 | 47.14 | 11.01 | 59,482 | 97,857 |
| 2020 | 46.11 | 11.57 | 68,125 | 46.93 | 10.90 | 58,182 | 100,962 |
| 2019 | 46.00 | 11.51 | 66,220 | 46.61 | 10.71 | 55,439 | 102,850 |
| 2018 | 46.06 | 11.65 | 64,716 | 46.62 | 10.83 | 53,794 | 103,007 |
| 2017 | 46.23 | 11.79 | 62,739 | 46.61 | 10.97 | 52,049 | 102,978 |
| 2016 | 46.15 | 11.73 | 60,965 | 46.51 | 10.95 | 50,629 | 104,632 |
| 2015 | 46.33 | 11.94 | 61,639 | 46.57 | 11.11 | 50,525 | 105,205 |
| 2014 | 46.55 | 12.12 | 59,228 | 46.77 | 11.44 | 48,825 | 104,431 |
| 2013 | 46.63 | 12.19 | 57,416 | 46.92 | 11.64 | 47,583 | 105,186 |

### Defined Contribution Plan Active Participant Statistics[1/]

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| Year Ended | Average Age | Average Service | Average Salary | Average Age | Average Service | Average Salary | Total Number of Active Participants |
| 2022 | 41.30 | 1.30 | $50,329 | 41.16 | 1.29 | $48,233 | 17,711 |
| 2021 | 40.93 | 1.01 | 46,806 | 40.65 | 1.05 | 45,513 | 13,441 |
| 2020 | 40.50 | 0.64 | 44,651 | 39.92 | 0.64 | 43,709 | 10,237 |
| 2019 | 39.14 | 0.21 | 41,172 | 38.64 | 0.16 | 40,004 | 6,814 |

[1/]Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

Source: Pennsylvania State Employees' Retirement System

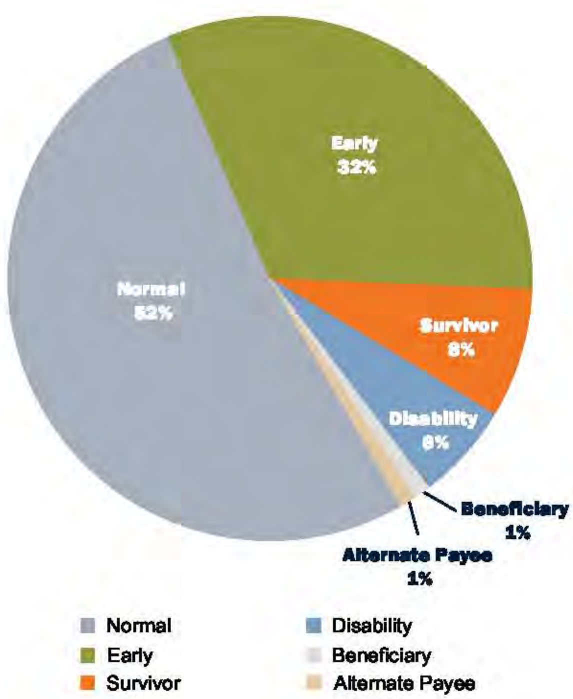
## Schedule of Retired Members by Type of Benefit

December 31, 2022 (unaudited)

### Defined Benefit Plan Retired Members by Type of Benefit

| Amount of Monthly Benefits | Total Monthly Benefits[1/] | Total Number of Retirees | Type of Benefit: Normal | Disability | Early | Beneficiary | Survivor | Alternate Payee |
|---|---|---|---|---|---|---|---|---|
| ≤ $500 | $6,105,566 | 25,438 | 5,282 | 361 | 16,201 | 416 | 2,591 | 587 |
| > 500 to 1,000 | 14,937,905 | 19,998 | 8,945 | 2,965 | 4,675 | 303 | 2,549 | 561 |
| > 1,000 to 1,500 | 21,804,554 | 17,578 | 9,157 | 2,202 | 3,828 | 155 | 1,848 | 388 |
| > 1,500 to 2,000 | 25,960,938 | 14,882 | 8,118 | 1,213 | 4,154 | 92 | 1,130 | 175 |
| > 2,000 to 2,500 | 29,362,421 | 13,097 | 7,620 | 703 | 3,850 | 59 | 796 | 69 |
| > 2,500 to 3,000 | 29,264,094 | 10,670 | 6,741 | 424 | 2,946 | 34 | 493 | 32 |
| > 3,000 to 3,500 | 29,650,722 | 9,147 | 6,114 | 228 | 2,417 | 23 | 351 | 14 |
| > 3,500 to 4,000 | 25,077,458 | 6,715 | 4,859 | 121 | 1,543 | 16 | 172 | 4 |
| > 4,000 to 4,500 | 21,333,320 | 5,041 | 3,835 | 65 | 993 | 16 | 131 | 1 |
| > 4,500 to 5,000 | 16,384,669 | 3,460 | 2,690 | 28 | 642 | 8 | 87 | 5 |
| > 5,000 to 5,500 | 13,920,386 | 2,657 | 1,924 | 13 | 634 | 7 | 78 | 1 |
| > 5,500 to 6,000 | 11,636,272 | 2,028 | 1,428 | 8 | 545 | 5 | 42 | — |
| > 6,000 | 37,350,859 | 4,936 | 3,772 | 7 | 1,069 | 3 | 84 | 1 |
| **Totals** | **$282,789,164** | **135,647** | **70,485** | **8,338** | **43,497** | **1,137** | **10,352** | **1,838** |

[1/]Does not include supplemental payments and transfers.



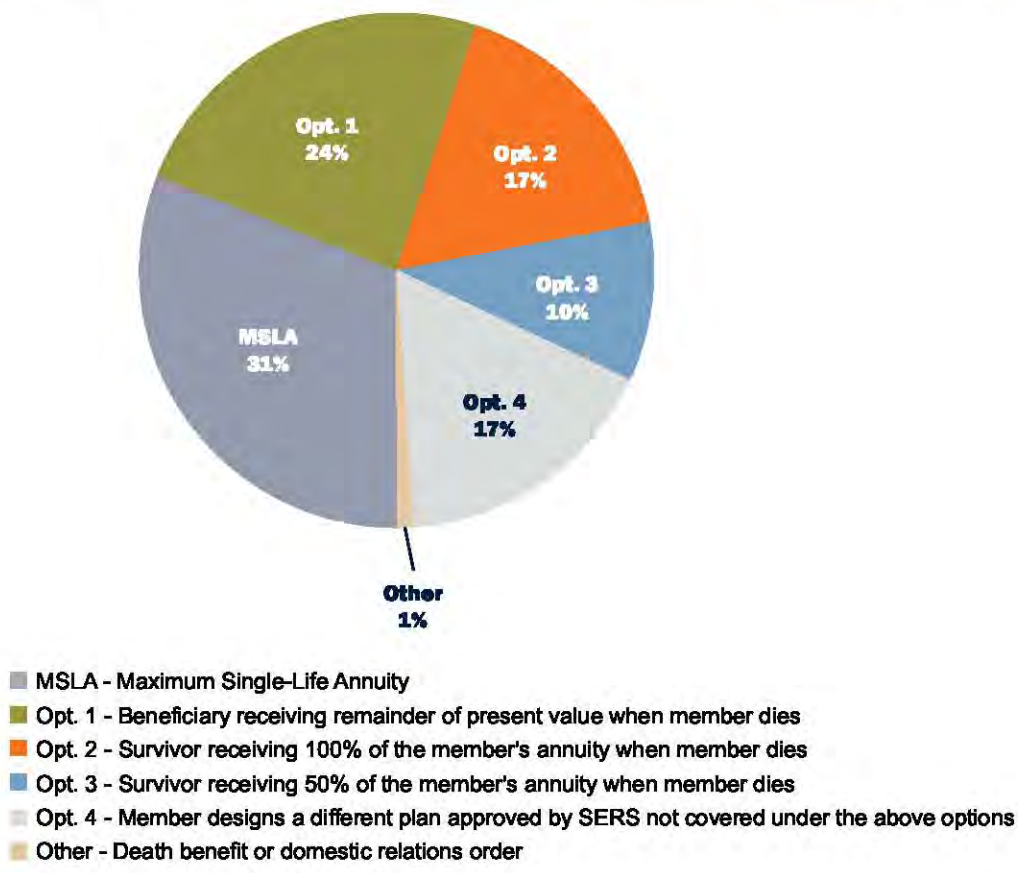

Source: Pennsylvania State Employees' Retirement System

## Schedule of Retired Members by Option

December 31, 2022 (unaudited)

### Defined Benefit Plan Retired Members by Option

| Amount of Monthly Benefits | Total Monthly Benefits | Total Number of Retirees | Option Selected | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | MSLA | Opt. 1 | Opt. 2 | Opt. 3 | Opt. 4 | Other |
| ≤ $500 | $6,105,566 | 25,438 | 5,905 | 10,200 | 5,337 | 1,295 | 2,266 | 435 |
| > 500 to 1,000 | 14,937,905 | 19,998 | 7,019 | 4,382 | 4,011 | 1,926 | 2,336 | 324 |
| > 1,000 to 1,500 | 21,804,554 | 17,578 | 5,607 | 3,691 | 3,560 | 1,868 | 2,688 | 164 |
| > 1,500 to 2,000 | 25,960,938 | 14,882 | 4,719 | 3,142 | 2,641 | 1,748 | 2,530 | 102 |
| > 2,000 to 2,500 | 29,362,421 | 13,097 | 3,931 | 2,694 | 2,250 | 1,570 | 2,590 | 62 |
| > 2,500 to 3,000 | 29,264,094 | 10,670 | 3,351 | 2,136 | 1,672 | 1,308 | 2,165 | 38 |
| > 3,000 to 3,500 | 29,650,722 | 9,147 | 2,808 | 1,875 | 1,317 | 1,144 | 1,979 | 24 |
| > 3,500 to 4,000 | 25,077,458 | 6,715 | 2,279 | 1,291 | 873 | 908 | 1,347 | 17 |
| > 4,000 to 4,500 | 21,333,320 | 5,041 | 1,676 | 904 | 647 | 655 | 1,142 | 17 |
| > 4,500 to 5,000 | 16,384,669 | 3,460 | 1,136 | 564 | 444 | 458 | 850 | 8 |
| > 5,000 to 5,500 | 13,920,386 | 2,657 | 848 | 412 | 323 | 306 | 761 | 7 |
| > 5,500 to 6,000 | 11,636,272 | 2,028 | 664 | 297 | 231 | 268 | 563 | 5 |
| > 6,000 | 37,350,859 | 4,936 | 1,723 | 649 | 567 | 691 | 1,303 | 3 |
| **Totals** | **$282,789,164** | **135,647** | **41,666** | **32,237** | **23,873** | **14,145** | **22,520** | **1,206** |




Source: Pennsylvania State Employees' Retirement System

## Schedule of Average Monthly Benefit Payments

December 31, 2022 (unaudited)

### Defined Benefit Plan Average Monthly Benefit Payments[1/]

| | Years of Credited Service | | | | | | |
|---|---|---|---|---|---|---|---|
| **Retirement Effective Dates** | **< 5** | **5-9** | **10-14** | **15-19** | **20-24** | **25-29** | **30+** |
| **Period 1/1/2022 to 12/31/2022** | | | | | | | |
| Average monthly benefit | $263 | $649 | $1,113 | $1,859 | $2,663 | $4,163 | $5,344 |
| Average final average salary | $45,502 | $53,553 | $58,346 | $67,185 | $74,767 | $91,570 | $91,041 |
| Number of retired members | 68 | 440 | 767 | 684 | 967 | 854 | 1,121 |
| **Period 1/1/2021 to 12/31/2021** | | | | | | | |
| Average monthly benefit | $379 | $664 | $1,081 | $1,750 | $2,636 | $4,327 | $4,996 |
| Average final average salary | $46,456 | $50,055 | $56,535 | $63,821 | $73,421 | $92,746 | $86,031 |
| Number of retired members | 55 | 409 | 832 | 576 | 1,040 | 829 | 1,179 |
| **Period 1/1/2020 to 12/31/2020** | | | | | | | |
| Average monthly benefit | $253 | $615 | $1,099 | $1,669 | $2,535 | $4,029 | $4,728 |
| Average final average salary | $41,977 | $51,381 | $55,608 | $62,136 | $72,097 | $86,841 | $83,005 |
| Number of retired members | 49 | 412 | 599 | 539 | 886 | 810 | 1,084 |
| **Period 1/1/2019 to 12/31/2019** | | | | | | | |
| Average monthly benefit | $258 | $570 | $1,061 | $1,606 | $2,422 | $3,778 | $4,654 |
| Average final average salary | $44,084 | $48,697 | $55,118 | $59,822 | $68,438 | $82,120 | $80,137 |
| Number of retired members | 76 | 512 | 839 | 574 | 861 | 940 | 1,178 |
| **Period 1/1/2018 to 12/31/2018** | | | | | | | |
| Average monthly benefit | $284 | $531 | $1,018 | $1,556 | $2,467 | $3,937 | $4,466 |
| Average final average salary | $39,834 | $46,591 | $54,260 | $58,668 | $68,305 | $84,510 | $78,312 |
| Number of retired members | 51 | 586 | 808 | 578 | 799 | 1,008 | 1,093 |
| **Period 1/1/2017 to 12/31/2017** | | | | | | | |
| Average monthly benefit | $226 | $488 | $928 | $1,490 | $2,352 | $3,853 | $4,495 |
| Average final average salary | $36,612 | $43,755 | $51,691 | $56,721 | $65,980 | $83,170 | $78,194 |
| Number of retired members | 46 | 681 | 820 | 526 | 788 | 1,033 | 1,166 |
| **Period 1/1/2016 to 12/31/2016** | | | | | | | |
| Average monthly benefit | $331 | $472 | $987 | $1,574 | $2,259 | $4,116 | $4,349 |
| Average final average salary | $48,086 | $45,428 | $51,515 | $57,976 | $63,844 | $85,896 | $75,240 |
| Number of retired members | 53 | 777 | 786 | 528 | 845 | 1,209 | 1,332 |
| **Period 1/1/2015 to 12/31/2015** | | | | | | | |
| Average monthly benefit | $308 | $433 | $896 | $1,369 | $2,279 | $3,396 | $4,214 |
| Average final average salary | $43,955 | $44,272 | $48,934 | $53,496 | $64,173 | $75,168 | $72,142 |
| Number of retired members | 71 | 924 | 744 | 515 | 772 | 1,036 | 1,454 |
| **Period 1/1/2014 to 12/31/2014** | | | | | | | |
| Average monthly benefit | $300 | $453 | $892 | $1,462 | $2,177 | $3,256 | $4,061 |
| Average final average salary | $43,879 | $43,513 | $48,310 | $55,258 | $61,462 | $72,587 | $70,590 |
| Number of retired members | 91 | 963 | 814 | 473 | 912 | 1,018 | 1,344 |
| **Period 1/1/2013 to 12/31/2013** | | | | | | | |
| Average monthly benefit | $262 | $399 | $845 | $1,466 | $2,178 | $3,408 | $4,036 |
| Average final average salary | $40,035 | $42,368 | $47,413 | $55,071 | $61,526 | $74,649 | $69,812 |
| Number of retired members | 68 | 947 | 779 | 496 | 814 | 1,049 | 1,451 |

[1/]Includes normal retirement, early retirement, and disability benefits for new retirees in the years listed.

Source: Pennsylvania State Employees' Retirement System

## Schedule of Average Annual Benefit Payments

December 31, 2022 (unaudited)

### Defined Benefit Plan Average Annual Benefit Payments

| | Normal | | Early | | Disability | | Beneficiary and Survivor | |
|---|---|---|---|---|---|---|---|---|
| **Age** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** |
| Under 25 | NA | NA | NA | NA | NA | NA | $12,944 | $6,109 |
| 25-29 | NA | NA | NA | NA | $18,290 | NA | 7,860 | 15,144 |
| 30-34 | NA | NA | $1,346 | $1,532 | 18,236 | $16,152 | 10,696 | 9,016 |
| 35-39 | NA | NA | 2,353 | 1,513 | 18,117 | 14,880 | 10,167 | 8,813 |
| 40-44 | NA | NA | 3,105 | 2,286 | 20,304 | 16,774 | 9,756 | 12,375 |
| 45-49 | NA | NA | 9,879 | 3,874 | 21,819 | 17,001 | 10,960 | 10,268 |
| 50-54 | $55,187 | $41,065 | 34,550 | 9,064 | 21,875 | 17,841 | 8,708 | 14,691 |
| 55-59 | 51,518 | 44,912 | 32,333 | 15,233 | 20,972 | 17,857 | 10,390 | 14,488 |
| 60-64 | 41,233 | 36,632 | 27,332 | 18,685 | 20,081 | 17,574 | 10,462 | 15,557 |
| 65-69 | 34,175 | 30,658 | 23,571 | 17,887 | 17,793 | 16,385 | 14,090 | 16,381 |
| 70-74 | 31,371 | 28,344 | 23,357 | 16,847 | 16,468 | 15,217 | 13,227 | 17,721 |
| 75-79 | 31,954 | 25,014 | 23,498 | 15,887 | 13,450 | 13,362 | 13,569 | 17,269 |
| 80-84 | 31,889 | 21,362 | 18,055 | 12,233 | 11,552 | 9,705 | 11,868 | 16,636 |
| 85-89 | 28,037 | 17,221 | 15,600 | 9,587 | 8,818 | 8,577 | 11,558 | 14,961 |
| 90 and over | 22,589 | 12,343 | 15,983 | 9,065 | 12,420 | 8,009 | 9,026 | 11,771 |
| **Total Average** | **$34,267** | **$27,304** | **$23,787** | **$14,670** | **$18,000** | **$15,667** | **$12,086** | **$15,783** |

| | Normal | Early | Disability | Beneficiary and Survivor |
|---|---|---|---|---|
| **Average Pension** | $31,331 | $19,334 | $16,780 | $15,323 |
| **Average Age** | 72.8 | 66.9 | 65.6 | 74.7 |

Source: Pennsylvania State Employees' Retirement System

## Schedule of Employer/Agency Participation

December 31, 2022 (unaudited)

### Defined Benefit Plan Schedule of Employer/Agency Participation - 5 Largest

# - Number of active members

% - Percentage of total active members

| Year Ended | Department of Corrections | | Department of Human Services | | Department of Transportation | | Pennsylvania State University | | Pennsylvania State Police | | Active Members for 5 Largest Employers/ Agencies | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | # | % | # | % | # | % | # | % |
| 2022[1/] | 14,424 | 14.96 | 14,360 | 14.90 | 11,352 | 11.78 | 6,627 | 6.87 | 6,283 | 6.52 | **53,046** | **55.03** |
| 2021[1/] | 14,701 | 15.02 | 15,147 | 15.48 | 11,841 | 12.10 | 6,455 | 6.60 | 6,385 | 6.52 | **54,529** | **55.72** |
| 2020[2/] | 15,143 | 15.00 | 16,074 | 15.92 | 12,023 | 11.91 | 6,653 | 6.59 | 6,362 | 6.30 | **56,255** | **55.72** |
| 2019[2/] | 15,359 | 14.93 | 16,404 | 15.95 | 12,144 | 11.81 | 6,868 | 6.68 | 6,432 | 6.25 | **57,207** | **55.62** |
| 2018[2/] | 15,610 | 15.15 | 16,396 | 15.92 | 12,088 | 11.74 | 6,772 | 6.57 | 6,353 | 6.17 | **57,219** | **55.55** |
| 2017[2/] | 15,435 | 14.99 | 16,624 | 16.14 | 12,221 | 11.87 | 6,308 | 6.13 | 6,255 | 6.07 | **56,843** | **55.20** |
| 2016[3/] | 15,752 | 15.05 | 17,205 | 16.44 | 12,312 | 11.77 | 6,367 | 6.09 | 6,219 | 5.94 | **57,855** | **55.29** |
| 2015[4/] | 15,362 | 14.60 | 17,085 | 16.27 | 12,434 | 11.82 | 6,111 | 5.81 | 6,459 | 6.14 | **57,451** | **54.61** |
| 2014[4/] | 14,916 | 14.28 | 16,870 | 16.15 | 12,325 | 11.80 | 6,123 | 5.86 | 6,323 | 6.05 | **56,557** | **54.16** |
| 2013 | 15,529 | 14.76 | 16,668 | 15.85 | 12,656 | 12.03 | 6,210 | 5.90 | 6,084 | 5.78 | **57,147** | **54.33** |

Numbers may not add due to rounding.

[1/] The membership includes 38 employers, and the commonwealth is classified as its largest employer. The commonwealth is comprised of 64 agencies and when everything is evaluated separately, the Defined Benefit Plan has a total of 101 participating employers/agencies.

[2/] The membership includes 38 employers, and the commonwealth is classified as its largest employer. The commonwealth is comprised of 65 agencies and when everything is evaluated separately, the Defined Benefit Plan has a total of 102 participating employers/agencies.

[3/] The membership includes 38 employers, and the commonwealth is classified as its largest employer. The commonwealth is comprised of 66 agencies and when everything is evaluated separately, the Defined Benefit Plan has a total of 103 participating employers/agencies.

[4/] The membership includes 39 employers, and the commonwealth is classified as its largest employer. The commonwealth is comprised of 66 agencies and when everything is evaluated separately, the Defined Benefit Plan has a total of 104 participating employers/agencies.

Source: Pennsylvania State Employees' Retirement System

## Schedule of Employer/Agency Participation

December 31, 2022 (unaudited)

### Defined Contribution Plan Schedule of Employer/Agency Participation - 5 Largest[1]

# - Number of active participants

% - Percentage of total active participants

| Year Ended | Department of Human Services | | Department of Transportation | | Liquor Control Board | | Pennsylvania State University | | Department of Labor and Industry | | Active Participants for 5 Largest Employers/ Agencies | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | # | % | # | % | # | % | # | % |
| 2022[2] | 2,805 | 15.84 | 2,785 | 15.72 | 1,923 | 10.86 | 1,709 | 9.65 | 1,098 | 6.20 | **10,320** | **58.27** |
| 2021[3] | 2,360 | 17.56 | 2,324 | 17.29 | 1,309 | 9.74 | 1,120 | 8.33 | 797 | 5.93 | **7,910** | **58.85** |
| 2020[4] | 1,979 | 19.33 | 1,650 | 16.12 | 1,030 | 10.06 | 847 | 8.27 | 678 | 6.62 | **6,184** | **60.41** |
| 2019[5] | 1,357 | 19.91 | 1,062 | 15.59 | 634 | 9.30 | 606 | 8.89 | 385 | 5.65 | **4,044** | **59.35** |

Numbers may not add due to rounding.

[1]Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

[2]Participation includes 20 employers, and the commonwealth is classified as its largest employer. The commonwealth is comprised of 59 agencies and when everything is evaluated separately, the Defined Contribution Plan has a total of 78 participating employers/agencies.

[3]Participation includes 21 employers, and the commonwealth is classified as its largest employer. The commonwealth is comprised of 57 agencies and when everything is evaluated separately, the Defined Contribution Plan has a total of 77 participating employers/agencies.

[4]Participation includes 20 employers, and the commonwealth is classified as its largest employer. The commonwealth is comprised of 57 agencies and when everything is evaluated separately, the Defined Contribution Plan has a total of 76 participating employers/agencies.

[5]Participation includes 18 employers, and the commonwealth is classified as its largest employer. The commonwealth is comprised of 54 agencies and when everything is evaluated separately, the Defined Contribution Plan has a total of 71 participating employers/agencies.

Source: Pennsylvania State Employees' Retirement System

## Schedule of Employer/Agency Participation

**As of December 31, 2022 (unaudited)**

### Complete Listing of Defined Benefit Plan Employers/Agencies[1/]

Administrative Office of Pennsylvania Courts*
Bloomsburg University Community Activities
Bucks County Community College
Bucks County Health Department
California University Student Association, Inc.
Capitol Preservation Committee
Center for Rural Pennsylvania*
Central Susquehanna Intermediate Unit
Chester County Health Department
Clarion University Students' Association*
Community College of Allegheny County*
Community College of Philadelphia
Delaware County Community College
Delaware River Joint Toll Bridge Commission*
Delaware River Port Authority*
Delaware Valley Regional Planning Commission*
Department of Aging*
Department of Agriculture*
Department of Banking and Securities*
Department of Community and Economic Development*
Department of Conservation and Natural Resources*
Department of Corrections*
Department of Drug and Alcohol Programs*
Department of Education*
Department of Environmental Protection*
Department of General Services*
Department of Health*
Department of Human Services*
Department of Labor and Industry*
Department of Military and Veterans Affairs*
Department of Revenue*
Department of State*
Department of the Auditor General*
Department of Transportation*
East Stroudsburg University Student Activity Association, Inc.*
Edinboro University Services, Inc.*
Environmental Hearing Board
Erie County Department of Health
Executive Offices*
Fish and Boat Commission*
Game Commission*
Harrisburg Area Community College*
Historical and Museum Commission*
House Democratic Appropriations Committee*
House of Representatives*
House Republican Appropriations Committee
Independent Fiscal Office*
Independent Regulatory Review Commission*
Indiana University Student Co-op Association*
Insurance Department*
Joint State Government Commission*
Kutztown University Student Services, Inc.
Legislative Budget and Finance Committee*
Legislative Data Processing Center*
Legislative Reference Bureau*
Lehigh Carbon Community College*
Liquor Control Board*
Local Government Commission*
Luzerne County Community College*
Mansfield University Community Services, Inc.*
Milk Marketing Board*
Millersville University Student Services, Inc.
Montgomery County Community College
Northampton Community College
Office of Attorney General*
Office of Liquidations and Rehabilitations*
Office of the Governor*
Office of the Lieutenant Governor*
Patient Safety Authority*
Pennsylvania College of Technology*
Pennsylvania Convention Center Authority*
Pennsylvania Emergency Management Agency*
Pennsylvania Gaming Control Board*
Pennsylvania Health Care Cost Containment Council*
Pennsylvania Higher Education Assistance Agency*
Pennsylvania Highlands Community College
Pennsylvania Housing Finance Agency
Pennsylvania Infrastructure Investment Authority*
Pennsylvania Municipal Retirement System*
Pennsylvania Parole Board*
Pennsylvania Port Authority*
Pennsylvania State Employees' Retirement System*
Pennsylvania State Police*
Pennsylvania State Senate*
Pennsylvania State University*
Pennsylvania Treasury*
Pennsylvania Turnpike Commission*
Port Authority Transit Corporation*
Public School Employees' Retirement System*
Public Utility Commission*
Reading Area Community College
Shippensburg University Student Services, Inc.
Slippery Rock Student Government Association, Inc.
State Civil Service Commission*
State Ethics Commission*
State Public School Building Authority
State System of Higher Education*
Susquehanna River Basin Commission*
Thaddeus Stevens College of Technology*
West Chester University Student Services, Inc.*
Westmoreland County Community College

[1/] The membership includes 38 employers and the commonwealth is classified as its largest employer. The commonwealth is comprised of 64 agencies and when everything is evaluated separately, the Defined Benefit Plan has a total of 101 participating employers/agencies.

*These employers currently have active participants in the Defined Contribution Plan.

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